COMPUTERWORLD

Microsoft pumps client/server | Wellfleet adds

Advanced Server price slashed in bold bid to win NetWare users

By Elisabeth Horwitt

Microsoft Corp.'s decision to give away its Windows NT Advanced Server client software will help entice first-time corporate buyers to choose NT over Novell, Inc.'s Net-Ware as their primary client/server platform, observers said last week.

Less clear, however, is whether bargain-basement prices will help Advanced Server carve a significant slice out of Novell's 68% to 70% share of the overall network operating system installed base.



PC price war

Rivals may squeeze Intel

By Michael Fitzgerald

Intel Corp. is staring straight at a pincerlike move that could force it to lower its prices and shift its Pentium strategy in 1994.

Surrounding Intel are the



CITY LIMITS

Reinventing government? Local-level IS chiefs such as the city of Phoenix's Vivienne Dacey are trying, but empty coffers and regulations are blocking their efforts.

See In Depth, page 132

PowerPC initiative from IBM, Apple Computer, Inc. and Motorola, Inc. and Cyrix Corp.'s coming M1 chip design, which that company plans to detail at the Microprocessor Forum on Oct. 18.

The first PowerPC systems started shipping last week. The various PowerPC partners have the potential to ship well over 1 million systems next year, according to analyst estimates. That could make PowerPC a solid volume competitor to Pentium, which analysts expect will ship in the 2 million to 3 million unit range in 1994

Staying on schedule

Moreover, the PowerPC alliance remains on schedule for the second part of the project, the 603 chip. Sources said the partners will announce at the Microprocessor Forum that they have developed the first implementation of the chip.

Intel also will face pressure from Cyrix. Like the Pentium, the M1 features a superscalar design. But unlike the Pentium, it does not Intel. page 7

6 XC

Furthermore, pricing will be only one consideration — and possibly a minor one — for companies choosing a network operating system, according to one user, several analysts and of course. Novell.

"Irrespective of dollar amounts, NetWare does outperform Advanced Server in file and print services, although not as an application server," said Louis Kahn, chief of network operations at the National Immunization Program in Atlanta.

Added John Donovan, a senior analyst at WorkGroup Technologies, Inc. in Hampton, N.H.: "Considerations like durability and reliability, administration and management tools are all tremendously important [to users], and Novell is very far ahead of NT on those scores."

Microsoft announced last week that client networking software Microsoft, page 10



- NetWare gets Unix spin; X/Open doesn't get USL code — yet. *Page 14*
- First PowerPCs arrive.
- Notes on Unix? Page 16

Wellfleet adds IBM flavor to router recipe

By Joanie M. Wexler

■ Wellfleet Communications, Inc. last week gave users a premature peek into the next version of its router software, an IBM internetworking-oriented upgrade that finally unites old and new Wellfleet platforms.

The software, due out in November, includes a list of IBM protocol support and network management enhancements aimed at the heart of user internetworking challenges to-day: force-fitting IBM host traffic onto LAN internetworks.

The new release will also bring the long-touted benefits of Well-fleet's 18-month-old Backbone Node family, such as software fault tolerance, to users of its older VME-based line, according to documents circulating at the Wellfleet user group meeting here last week. The VME-based routers are installed at the majority of Wellfleet accounts today.

Heet accounts today.

Release 7.6 represents the first box on the market to support Data Link Switching, the IBM-originated but now industry-driven standard scheme for merging SNA traffic onto distributed internetworks.

For IBM-heavy shops, Data Link Switching "addresses a legacy environment that now requires a whole extra support structure,"

Wellfleet, page 12



Source: The Yankee Group, Boston

Desktop application development

Windows 4.0, OLE 2.0 to test developer mettle

Windows 4.0 simplifies the task of sharing

application data

by allowing

users to drag icons across the

screen.

By Michael Vizard and Ed Scannell REDMOND, WASH.

As Microsoft Corp. begins its transition to Windows 4.0 and Version 2.0 of its Object

Linking and Embedding interface, the coming year is likely to be remembered as one of the most trying times for Windows developers.

Microsoft currently plans what amounts to a redesign of the Windows graphical user interface in Windows 4.0, known as Chicago. It will also deploy an object-oriented programming environment in the guise of OLE 2.0.

The prospect of a redesigned Windows interface, which will steadily evolve through-

out its upcoming beta cycle, presents developers with a significant challenge as they march through their own development projects.

For example, a developer planning to de-

ploy an application in 1994 is currently working with the Windows 3.1 interface. But a developer at a rival company may opt to start working with the user interface in Windows 4.0 early next year. Doing so would give the second developer a nicerlooking, native Windows 4.0 application as early as six months after the first developer deliv-

ered a Windows 3.1 application.

Microsoft is saying that Windows 3.1 ap-Windows development, page 8

#BXBBJFT########### 5-DIGIT 48103 #UIU7ZE300M099039# 0080109205 UNIUERSITY MICROFILMS INT ## 0884

UNIVERSITY MICROFILMS INT UNIVERSITY MICROFILMS INT SERIAL PUBLICATIONS

300 N ZEEB RD

ANN ARBOR

er

ap

Sp

e w

MI 48103

NEWS

- ■Customers and analysts worry about the lack of detail in Lotus' strategy for enhancing and modernizing CC:Mail. Page 4
- New England Medical Center employs a revolutionary, network-centric approach to patient care. Page 4
- ■The Society for Information Management works with vendors to define terms in software licensing debate. Page 6
- ■Oracle forges partnerships with traditional mainframe utilities makers to provide customers with mainframe-caliber systems management tools. Page 6
- ■IBM will soon unveil software to manage distributed LAN Server systems via either host or OS/2-based NetView. Page 10
- HP pledges (again) to fix its archaic order-fulfillment system and reconsiders porting its HP 3000 database to the Unix platform. Page 12
- Novell tightens links between UnixWare and NetWare, including expansion of a certification program to include UnixWare. Page 14

ADVANCED TECHNOLOGY

■It can be a long way from concept to product, as is clear from a catch-up look at some of the leading-edge technologies we've covered during the past three years. Page 32

DESKTOP COMPUTING

■ Compaq breaks ground in several areas with its Concerto pen/keyboard portable. Page 41

WORKGROUP COMPUTING

■ Early reviews of Microsoft's SQL Server are good, but customers worry about factors outside Microsoft's control. Page 49

ENTERPRISE NETWORKING

■3Com announces a set of applications for managing its network products. Page 67



Ed Trainor at Southern California Gas says you can buy a lot of contractor for the cost of a full employee compensation package. Page 113

LARGE SYSTEMS

■NCR establishes a dedicated software division and adds fault-resilient software to support server clustering. Page 79

APPLICATION DEVELOPMENT

■ Wang takes the first step to move its Pace line of application development tools into the general-purpose category. Page 107

MANAGEMENT

■Contract programmers aren't just extra labor for peak work loads. Some companies find that temporary hires can help train staffs in new technologies. Page 113

IN DEPTH

■Information systems groups in local government battle both cost cuts and bureaucratic red tape. Page 132

INTEGRATION STRATEGIES

■Integration projects aren't something you can just hand off. Even if you find a great integrator, which takes some effort, you still have to manage the process all the way. Page 121

CAREERS

■If you know one version of Unix, learning another version is not a big stretch. Page 140

MARKETPLACE

■ A former consultant discloses shortcuts and billing games that hired advisers sometimes play. Page 149

COMPUTER

■It's survival of the fittest in the internetworking market. Page 157

COMMENTARY

■IBM researchers may business. Page 121 have discovered a way to exponentially increase disk drive capacity without upping power drain, according to Charles Babcock. Page 6

Integration Strategies:

Michelle Wells at KFC saus

systems integrators need

up-close exposure to your

■Client/server looks wonderfully easy when you consider only the client side, Paul Gillin says. Most of the complex parts are found on the other side of the slash mark. Page 36

■ Information technology could be used to simplify the way we do business, Michael Schrage writes. But too often, we're using it to manage unnecessary complexity. Page 37

Executive Briefing

Better management through consistency is an idea that a couple of networking product vendors are saluting this week. Wellfleet's new router software release will cater to mixed IBM/LAN shops and unites features across its older and current platforms. Page 1. In the meantime, 3Com has announced a set of applications that will unify the management of its large variety of hubs, routers and network adapters. Page 67

Champing at the bit for multimedia capability? Developments on several fronts will soon give you more to work with. HP is scrapping its line of X Window System terminals in favor of a new multimedia-capable line called Envizex. Page 53. Oracle is road-testing massively parallel databases capable of manipulating video and sound in tests of interative TV applications by **Bell Atiantic** and **US West**. Pieces of this product line, dubbed Media Server, are expected to ship to developers in January. Page 85. And disk drive maker Micropolis has introduced the first magnetic drives designed for digital audio/ video applications. Page 44

Some potential customers are worried about the sizable hardware commitment that Microsoft's SQL Server for Windows NT might require. Page 49. This issue spells opportunity for Netpower, a start-up funded by Silicon Graphics, Stanford University and venture capitalists. Netpower will announce today that it is shipping a RISC-based server for Windows NT, and it will market client and server versions together with Microsoft. Page 61

Nothing is going to make client/ server as safe or easy as the mar-

keting hype would have you believe (Page 36), but some alliances are at least bringing some familiar utilities and mainframe capabilities into this rough territory. Oracle has provided APIs for its database to Legent, BMC and five other large-system specialists in systems management tools. Page 6. Legent has also allied with HP to produce an integrated suite of tools spanning mainframe and Unix client/ server environments for performance and resource manage ment. And in another combination move designed to allay concerns about merging legacy systems with open or distributed platforms, Sun and Amdahl have announced plans to collaborate. Page 24



No Fences. No Boundaries. No Limits. That's The Freedom Of CA90s.

The freedom to choose the best applications without worrying about hardware constraints.

The freedom to right-size your entire computing environment with the best mix of hardware platforms.

And the freedom to integrate and automate all your applications across the many proprietary, closed environments you face today. It's all there inside the most comprehensive architecture ever developed: CA90s.

The only architecture that supports every major hardware platform including IBM, Digital, Hewlett-Packard, Apple, Fujitsu, Bull, Data General, Tandem and Hitachi. All the major operating systems: MVS, VSE, VM, VMS, UNIX, APPLE, WINDOWS, DOS and OS/2.

And the world's broadest range of integrated software solutions, covering systems management, information management and business applications.

If you're tired of being fenced in, call 1-800 CALL CAI for complete information on CA90s.

The architecture that can set you free.

ASOCIATES Software superior by design.

©Computer Associates International, Inc. One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

What's to come

Near term (expected by year's end, in rough order of delivery): Organizer for Macintosh: overdue Macintosh version of groupscheduling software. CC:Mail for Macintosh 2.1: fixes problems such as slow response and lack of spell check-

•CC-Mail Remote for DOS 3.5: includes wireless support and message previewing •CC:Mail for Unix 1.1: client software for Solaris 2.x and OSF/Motif ows Managers •CC:Mail Link to MHS 2.0: updated gateway to Novell's MHS. Automatic Directory Exchange (ADE) 2.0: CC:Mail post office directories and allow multiple iterations of the same user name. ·Admin. 5.0: administration tools for ADE includes a free set of administration utilities.

Midterm (three to 12 months out): •Windows Mobile 2.0: remote version of CC:Mail for Windows multiple location profiles, wireless drivers. Organizer Scheduling for DOS: interoperable with Windows and Macintosh versions. Organizer connection to IBM Professional Office Systems or OV/VM: partnership between Attachmate Corp. and Lotus to allow searching for free time and exchange of meeting notices across mainframes and LANs.

Long term (12 to 18 months):

•Seguoia Post Office: overdue update to traditional CC:Mail post office that does not require users to take the server down to reclaim disk space. •New Sequoia routers and gateways: includes a DOS version of the LCS. •CC:Mail Post Office Edition clients: offers unified set of features across platforms •LCS: multitasking X.400/SMTP-based server that will route mail traffic to CC:Mail or Notes directories and will support non-

Lotus overhauls CC:Mail

Plans to meet user demands for management, migration

By Lynda Radosevich SANFRANCISCO

Lotus Development Corp.'s blueprint for modernizing CC:Mail signals that it has recognized the most urgent needs of CC:Mail customers: management and administration features and a method to migrate to client/server platforms.

Officially unveiled at the annual CC:Mail user conference here last week, parts of the Lotus strategy, however, are long on intention and short on details. This is leading some customers and analysts to question whether Lotus can follow through on its promises in a timely manner, something with which the company often has difficulty (see story page 16).

For instance, Lotus executives echoed users' complaints by conceding that CC:Mail needs better wide-area management administration. The company also committed to providing those management features, but it did not define how or when it would be done.

"The good news is they articulated a strategy that makes sense because it gives us a growth path," said Larry Quinlan, manager of LAN services at CC:Mail user site Deloitte & Touche in Nashville.

Highlights of the CC:Mail game plan included an upcoming messaging server called the Lotus Communications Server (LCS). Based on Notes technology, it will use native X.400 and Simple Mail Transport Protocol (SMTP) transports and support the X.500 directory protocol [CW, Sept. 20]. It will operate on Microsoft Corp.'s Windows NT, Unix and OS/2 and will function as a Novell, Inc. NetWare Loadable Module. By supporting various application programming interfaces, the server will work not only with Notes and CC:Mail clients but also with archrival Microsoft's Mail.

"Lotus is making major changes in terms of

'openness.' " said David Marshak, an analyst at the Patricia Seybold Office Computing Group, a consultancy in Boston.

Doing so may allow Lotus to hold off a challenge from Microsoft, which is developing an X.400-based Enterprise Messaging Server (EMS) that runs only on Windows NT. For customers that do not want to be forced into using NT but are accustomed to Microsoft's Mail interface, the Lotus server could provide backend services, Marshak said.

May miss the mark

But Lotus officials were unable to predict how parts of the server would be done. This led industry analyst David Ferris, editor of the San Francisco-based newsletter "Ferris E-mail Analyzer," to conclude that Lotus is not very far along in its development process.

Lotus' timing could be critical. Microsoft has indicated that EMS will ship in the first half of 1994. While Microsoft's plans may not affect some current CC:Mail customers, they could sway users who are just beginning to migrate from mainframe systems or who are beginning to reevaluate their electronic-mail strategies.

GE Capital Fleet Service in Eden Prairie, Minn., is one of those companies. A CC:Mail site for two years with 1,300 users, the car-leasing company will begin in two weeks to reexamine the major E-mail systems, said Terry Sovil, a project manager in office automation.

Lotus also reiterated that it is developing an updated post office, called Sequoia, for traditional CC: Mail. Also, the company said it will develop new client software to work with Sequoia.

For Notes/CC:Mail integration, Lotus will deliver a client/server version of CC:Mail that will use the Notes directory store and LCS for transport. Eventually, this version and Notes will share the same interface, Lotus officials said.

Lotus is also working on a stand-alone forms package for early 1994 delivery that will operate across Notes and CC: Mail and will allow access to information in the Notes database.

All we want from Lotus is....

ustomers of CC:Mail at last week's user group conference differed on what capabilities they want Lotus to deliver first, but enthusiasm for an updated new directory was high.

For example, Joe Klehe, a networking engineer at Syntex, Inc., a pharmaceutical company in Palo Alto, Calif., said directory synchronization among CC:Mail post offices is his top priority.

The current release of Lotus' Automatic Directory Exchange (ADE) sends updates from one post office to another but does not verify that post offices are "in sync." This leads to creeping directory corruption, Klehe said.

The upcoming ADE Version 2.0 appears to address this limitation, but in the meantime, Syntex has created a homegrown synchronization program that does the job.

Other users were more interested in seeing CC:Mail connections to outside systems improved.

Gregory Kandl, chief of the information planning and requirements branch at a large government organization based in Chicago, said he is indifferent to Lotus' messaging server announcement. What he really needs are X.400 and SMTP gateways to exchange mail with outside organizations, he said.

For Terry Sovil, an office automation manger at GE Capital Fleet Service in Eden Prairie, Minn., electronic forms based on Notes or CC: Mail is his top priority. That is because the company is striving to "go paperless" as part of a broader move to client/server computing, he said. - Lynda Radosevich

Medical center in tune with Clinton reform

By Joanie M. Wexler

■When the Clinton administration's health care reform plan hit the streets last week, at least one medical services provider was already en route to overhauling its patient care delivery system via new information technologies.

New England Medical Center here is revamping its business, a monumental task that includes redefining its relationship with insurance carriers and instigating a network-centric approach treating patients.

The goal is to leverage emerging technologies as an incentive for the facility to streamline operations and conserve costs while

boosting the quality of care, said Bill Montgomery, vice president and chief information officer.

The center believes it will be "more efficient for us to get information from videoconferencing or digital imaging" while still providingquality care. Montgomery said.

But the multiyear plan stretches beyond the efficiencies associated with automation. The center is banking on the power of networks to allow physicians the freedom to provide what they deem appropriate treatment independent of what they will be reimbursed for.

The idea is to discard the current insurance system of being reimbursed for "doing things to people," and instead contract with an insurer for a certain number of dollars to handle a given patient case in whatever method a physician sees fit, including networkoriented home care. The center would eat the cost if not successful and thus be incented to provide quality care.



New England Medical's agenda, which is in step with an aspect of the Clinton plan that encourages using the information superhighway [CW, Sept. 20] to bring hospi-

es Ltd. Chicago

tals, doctors, patients and insurers together, depends on newgeneration networking technologies such as Integrated Services Digital Network (ISDN), T3 (45M bit/sec.) leased lines and Asynchronous Transfer Mode (ATM).

Trials under way include a joint effort with IBM in which outpatients' family members provide real-time data about patient status through a PC that acts like a remote hospital LAN node. They communicate through the PC over ISDN or dial-up lines via modems.

Interhospital trials with T3 lines and ATM are helping the center assess the benefits of interphysician discussions about treatments.

What the center is doing addresses the key issues medical facilities need to address in order to survive: how to decrease costs and re-engineer delivery systems, said health care information systems consultant Charles Singer, president of Charles J. Singer & Co. in Wakefield, Mass.

Client/Server CC:Mail:

Lotus mail clients

CC:Mail for LCS.

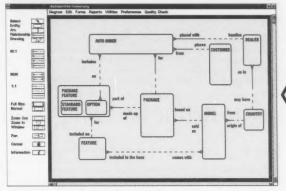
A picture is worth a thousand lines of code.

"Oracle CDE is central to ITT Hartford's strategy for delivering comprehensive information systems quickly and cost-effectively throughout the enterprise. CDE aids us in bringing new products to market quickly and with higher quality and reliability."

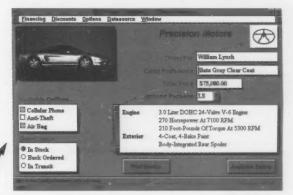
Robert Conway Director, IES Hartford Insurance



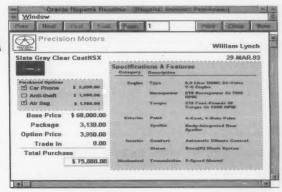
Oracle Designer



Oracle CDE uses high level, easy to use, objects and rules to generate sophisticated applications without any programming.



Oracle Forms



Oracle Reports

CDE is a complete and integrated suite of application design and modeling tools that empowers system designers, programmers, and end users to cooperate in building client server applications quickly. CDE's CASE design, development, and graphical reporting tools eliminate extensive programming to help speed and simplify your application development efforts.

Call to receive a comprehensive white paper on CDE, written by industry analyst Butler Group. 1-800-633-1071 Ext. 8123

ORACLE

ORACLE

10 billion bits per square inch?

BM researchers in San Jose, Calif., have seized on a commonly known phenomenon, giant magnetoresistance, and are finding a way to apply it that could multiply disk drive capacity fiftyfold and supply a boon to low-power mobile computing (see story page 32).

Competitors are shaking their heads in disbelief that any such gains will materialize before the year 2000. "I think talk about giant magnetoresistance is speculation. It's seven to eight years away," says Charles Christ, vice president of Digital Equipment Corp.'s Storage Business unit. But IBM is talking about giant magnetoresistance drives within three years.

I understand skeptics who say IBM is desperate for good news, but they should remember that IBM has been a leader in storage for 26 years. After visiting its Advanced Storage and Retrieval facility, I would say IBM is going to make good on its claims. If it does, drive capacity will not only increase dramatically, but drive sizes will continue to shrink. Giant magnetoresistance encourages further miniaturization.

An IBM

breakthrough

promises

mega

storage

on small,

low-nower

disk drives.

Charles Babcock

Today's hard drives are based on induction, where a magnetic field representing a bit induces a tiny electrical current as it passes under the drive head. The force of the field depends on the spinning disk's speed, and supplying power to the disk motor is a drain on a battery-powered laptop.

Drive heads based on plain vanilla magnetoresistance, which have been on the market only a short

the market only a short while, function by registering a change in the resistance to electricity in a conductor when it is exposed to a magnetic field. Resistance typically increases 4% to 6% maximum (or 1% in the small scale of a drive head).

It has been known for some time that this effect can be magnified under special circumstances, increasing resistance by 40% to 60%. Generating this kind of giant magnetoresistance in the past has required magnetic fields 1,000 to 2,000 times stronger than those used on a hard disk and temperatures of minus 450 degrees Fahrenheit, not exactly optimum conditions for the desktop.

What IBM engineer Todd Hylton and three associates have done is find a way to create giant magnetoresistance with materials and conditions that mimic those in use today.

Because giant magnetoresistance yields a pronounced effect from a small magnetic field, future drives based on it will allow the bit size to shrink further and the disk spin to slow, reducing power consumption. All forms of hard drives would benefit, but portable computing would be one of the largest beneficiaries.

The IBM team attacked the problem by sandwiching a layer of nonmagnetic silver between two ultrathin layers of nickel/iron. The nickel/iron layers naturally aligned their magnetic poles in opposite directions, similar to the way refrigerator magnets repel each other unless they are brought together at opposite poles.

When the metals were annealed, or heated briefly, at 572 degrees, the silver was found to penetrate the neighboring layers of nickel/iron, reducing the strength of their antiparallel alignment.

When the baked sandwich was then exposed to a magnetic field, the force was sufficient to cause the poles in the nickel/iron to realign in parallel, creating the giant magnetoresistance effect. To their surprise, the IBM engineers had found a way to partially "decouple," in Hylton's words, the strength of the magnetic alignment and allow very small magnetic fields to trigger giant magnetoresistant signals. "A 100M-byte drive may one day be the size of a computer chip," Hylton suggests, and IBM claims it will achieve 10 billion bits (1.25G bytes) to the square inch on drives before the end of the decade.

My guess is Hylton is talking with such confidence because IBM has already taken this technology beyond the laboratory stage.

Bahcock is Commuterworld's technical editor. His MCI Mail address is 575-2737.

Oracle eyes systems management

By Kim S. Nash REDWOOD SHORES, CALIF.

Oracle Corp. database users might have mainframe-caliber systems management tools, such as backup and restore and capacity planning utilities, in hand by mid-1994.

Oracle announced last week that it will give Legent Corp., BMC Software, Inc. and five other mainframe and high-end Unix systems management makers application programming interfaces (API) for the Oracle database (see chart). Those vendors said they intend to use the APIs to build links between their management utilities and Oracle databases.

Oracle users cannot wait.

A lack of powerful, stable utilities for Unix has been one downsizing holdup for companies such as Telephone and Data Systems, said Jim Gillespie, database analyst at the Madison, Wis., utility.

Mainframers "are used to security, administration and monitoring tools that haven't yet appeared in the Unixworld. That's part of what keeps us on the mainframe," said Gillespie, who is also head of an IBM MVS special interest group within the International Oracle Users Group.

Other users said they were happy about Oracle's intentions but questioned whether mainframe-style products are appropriate for a Unix setting. "The problem is that most of these mainframe companies still think mainframe," said Sylvia Vargas, head of the Puget Sound Oracle user group. If Legent and others simply port existing tools to other platforms, "that's not solving the problem at all," Vargas said.

Utilities appropriate for centralized comput-

ing will overlook sets of problems found in distributed database systems, some users said.

For example, setting up parameters authorizing which users can log on to which systems is simpler in a centralized mainframe configuration than for a network of 10 distributed databases running on various hardware platforms, said Paul Song, chairman of the Northwest Oracle user group.

As it stands now, the Oracle database lacks certain management facilities such as thor-

Tools at your disposal

Mainframe and high-end Unix software makers plan to build links — via an Oracle API — between big iron systems management tools and Oracle databases for use in client/server setups

SAMPLING OF TOOLS

BMC Software Systems optimizers, backup and recovery

EcoSystems Configuration management, capacity planning

Epoch Systems Backup and recovery, storage

Legent Network backup and recovery

Performance analysis, storage management, network

management, network monitoring

Open Vision Performance analysis

Patrol Software Capacity planning, backup and recovery

ough self-monitoring in a client/server setup, according to Brad Howie, senior associate at Cornerstone Computer Associates, Inc., a consulting group specializing in Oracle technology in Vancouver, British Columbia.

SIM tries to define licensing terms

By Mitch Betts

WASHINGTON, D.C.

The Society for Information Management (SIM) forged ahead last week with its mission to make software contracts more customer-friendly by starting to define such slippery concepts as user-based pricing and enterprise-wide licensing.

At a summit meeting with software vendors

here, both sides agreed to draft standard terminology to prevent misunderstandings and then develop detailed licensing guidelines for the industry. Harvey Shrednick, senior vice president for information services at Corning, Inc., said the guidelines may be ready by April 1994.

The goal is to eliminate what users consider unfair software fees and still allow vendors to make a profit [CW, April 26]. The dialogue for reaching a middle ground began last week, but both sides discovered the need to clarify the terms of the debate.

For example, SIM's April position paper urged vendors to move from machine-based pricing to more flexible schemes, such as pricing based on the number of users on a system. But vendors asked how to count the users.

"What if three people use one terminal on different shifts? Should access by remote [or casual] users mean an additional fee? If one person puts software on their office PC, laptop and home PC, how many users is that?" asked Ellen Ray, assistant general counsel at Dun & Bradstreet Software in Atlanta.

Likewise, Ray said, questions exist about

how to define the "enterprise" for enterprisewide licensing: "Does that include international offices? Do updates get distributed to all sites across the globe or just the headquarters?"

During the next six months, SIM's Software Licensing Task Force will try to hammer out an agreement on those details and other issues, said Shrednick, who is SIM's vice president for communications.

Information systems chiefs had their own set of concerns, especially about upgrade fees and transfer

fees. "If the user moves the software to a more efficient machine — and the software doesn't have any more features or users — why should you pay \$200,000 more?" Shrednick asked.



Corning's Harvey Shrednick: Guidelines may be ready by April 1994

Rivals press Intel

CONTINUED FROM PAGE 1

require 486 code to be recompiled for top performance. Sources said Cyrix claims that a 66-MHz chip based on the M1 design will run most 486 code 30% to 50% faster than today's 66-MHz Pentium.

Cyrix declined to comment on possible performance numbers.

The double whammy of PowerPC and the M1 means that "things are getting much more interesting" for Intel in the market, said Linley Gwennap, editor in chief of the "Microprocessor Report" in Sebastopol, Calif. But Gwennap said the multiple 486 clone efforts are of more immediate concern to Intel and will have a bigger near-term impact on users.

IBM has already beaten Intel to market with a clock-tripling 486 clone, and analysts said Cyrix and Advanced Micro Devices, Inc. will likely bring similar chips to market in 1994. With competitors keeping pace with Intel's coming DX3 [CW, July 19], Intel may find its current cash cows threatened before Pentium ships in high enough volumes to replace them as profit-generators.

The pressure is on

"Intel is going to start to get squeezed [in the 486 market]. I think 486 prices will be dropping rapidly in 1994, which will be the most significant thing to 90% of the users out there," Gwennap said.

'We expect to see 486 pricing drop due to competition and the new [DX3s]," said Jim McDonnell, marketing manager at Hewlett-Packard Co. in Sunnyvale, Calif. However, he said HP does not expect dramatic price cuts until the second half of 1994. Some analysts suggested that sharp reductions in 486 pricing could lead to systems priced less than \$1,000.

Users trying to decide whether to buy 486 workstations now or wait for Pentium pricing to drop may opt for the 486 with the price cuts.

"With the software requirements we see on the horizon, we'll probably need to move beyond the 486, but if prices drop, we can buy the higher-level 486s,"

In the oven

Looking to drive up its volumes, Intel has a multiprocessing surprise coming late in the second quarter of next year, according to OEM hardware sources who asked not to be identified.

Intel is working on chip sets that will allow systems makers to build servers that support more than two processors on the same motherboard, the sources said.

Intel's C5C8 chip set supports only two processors; Intel is discussing ways to implement five and six Pentium processors on a single motherboard.

-Michael Fitzgerald

said Abraham Chait, a team lead at Pacific Gas & Electric Co. in San Francisco.

Because its competitors appear unlikely to ship chips until the second half of 1994. Intel has time to react, analysts said. The chip maker plans to shift Pentium production to a new process known as 0.6 micron, which will let it bring out higher-performance Pentiums.

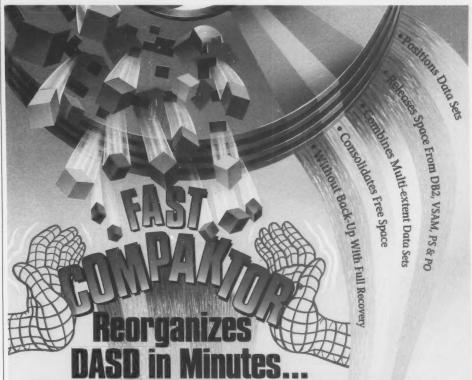
Those Pentium parts, code-named P54C, should match the M1's expected performance levels, though this will still mark the first time Intel has not been a generation shead of the cloners

Seeking to nip PowerPC in the bud, Intel plans a frontal assault on its target market: Macintosh users. Intel will start advertising in major Macintosh user publications in October to persuade those users to move to Intel platforms.

"They see a chance to get this market in a transition time," said Tom Thornhill, an analyst at Montgomery Securities in San Francisco.

Also in Intel's favor: Several sources said the Cyrix M1 chips will not be pinand socket-compatible with Intel's chips, which may create design and software compatibility issues.

Bruce Burkhardt, director of strategic marketing at Cyrix, declined to comment on whether it would opt to match Intel's design. "Let me propose that the 486 and the Pentium are not socket-compatible. If Intel doesn't have to be compatible why should anybody else be compatible?"



Consolidates Free Extents and Releases Unused Space 50 to 80% Faster than IBM's DFDSS DEFRAG...with the added value of:

- Releasing Space from VSAM and DB2 files
- Releasing All or a Percentage of Unused Space during COMPAKTion and Stand Alone
- FASTCPK offers CANCEL Protection and Full **Recovery from Job or System crashes**
- Positioning Data Sets by Last Reference Date or User Specified
- Expanding and Positioning the VTOC
- · Combining Extents on VSAM, DB2, PS and **PO Data Sets**

- Compare for Yourself -

Send for FREE Report Program which Simulates COMPAKTion on your volumes



Call for a FREE No Obligation 90 Day Trial

"MOVATION" DATA PROCESSING

CORPORATE HEADQUARTERS: 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300

 EUROPEAN
 FRANCE
 GERMANY
 NETHERLANDS
 UNITED KINGDOM
 NORDIC COUNTRIES

 OFFICES:
 01.47-69-15-15
 089-439-2053
 036-534-1660
 081-905-1266
 +31-36-534-1660

Windows, OLE

CONTINUED FROM PAGE 1

plications will run on Windows 4.0. But an application written for 4.0 is going to look a lot nicer," noted Don Baarns, president of the Baarns Consulting Group, Inc. in Sylmar, Calif.

Microsoft is expected to deliver tools

Windows 3.1 applications to comply with the Windows 4.0 interface. But when the tools will arrive and how robust they will be has developers concerned.

"It's definitely something we're looking at. In the back of our heads, we're asking ourselves, 'Are we wasting our time right now?'" said Michael Abele, vice president of programming services at Varitee Corp. in Birmingham, Mich.

Meanwhile, the few developers that al-

face with their Windows-based products something Microsoft will introduce for the first time with Windows 4.0 - will have another interface problem.

This drag-and-drop protocol will be a key technology behind the Windows 4.0 document metaphor. For instance, it will allow users to easily share data across Windows applications that have live links by dragging icons across the screen, as opposed to cutting and past-

One developer dealing with this issue is Keyfile Corp., maker of a work-flow application. It is considering delivery of two different shrink-wrapped versions: one package with Keyfile objects integrated onto the Chicago desktop and another with Keyfile objects on top of Keyfile's existing desktop metaphor, said Kim Shah. vice president of marketing.

Meanwhile, developers continue to wrestle with the concepts Microsoft is presenting in OLE 2.0, which comprises more than 400 interfaces. The problem facing developers is that while there will be a base level implementation of OLE 2.0, each software developer is essentially free to implement any subset of the OLE 2.0 specification they choose

Consequently, one application may

call for a service from another that does not support it. This means users are going to applications that are better integrated with applications from the same vendor (because they will all support the same inter-

Unix partners In addition to working on OLE 2.0 for Windows, Microsoft is also joining forces with several Unix systems dors to port OLE 2.0 to Unix, according to Kraig Brockschmidt, a Microsoft systems engineer.

faces) than with applications from vendors that might not implement the same subset of OLE 2.0 interfaces

As a result, OLE 2.0 might actually serve to encourage users to purchase software from a single vendor.

'It's a big problem. Microsoft is going to have to refine the OLE 2.0 standards to ensure true compatibility across applications, said Daniel Grant, president of Tangent International Computer Consultants. Inc. in New York.

How to be objective

Developers not only face the problem of which interfaces to write to but also the testing of applications they produce.

'The problem is not just writing to all these interfaces but in finding a way to objectively test them. Without that, a lot of this [development] will be pretty useless," said Vadim Yasinovsky, president of Clear Software, Inc.

A lobbying effort is under way among some developers to set up a laboratory where developers can test their applications against a defined set of parameters. Microsoft officials said they will not provide such a facility themselves, but they would back the idea of an independent laboratory.

The lack of a testing and certification program is important because it could stall OLE 2.0's momentum if the OpenDoc alliance — led by IBM and Apple Computer, Inc. - follows through on a promise to set up a similar program and facility late this year or early next year.

Another problem some developers see is that OLE 2.0 cannot support the transfer of OLE files over networks. Microsoft officials have acknowledged that users will not be able to move or delete OLE files over networks until the company ships Cairo sometime in early 1995.



Stairway To Avalon

MRP, distribution and financial applications. And re-engineering them into Enterprise Resource Planning (ERP) systems seems light years away. We're Avalon, and our CIIM time machine gives you an alternative to making that climb all by yourself.

Our twelve, tailorable application modules will elevate you out of your old applications. They're CASE-based, which means you get documented, reliable and quality systems, capable of continuous future escalation. Application source code is included, which means you are independent and in control. And they use the native tools of either Oracle or Sybase, on any platform of your choosing.

All of which means you control the ride.

We've written a white paper showing how to continuously reengineer yourself, just like GE,

IBM, Motorola, Panasonic, SAAB-Scania,

VW and Yamaha are doing, with Avalon.

AVALON

Have Time Machine. Will Travel.

GOING
OUR
WAY:

Call
today for a
copy of The
Re-engineering
Time Machine white
paper ... so you won't
exhaust yourself,
climbing all those
stairs, all by

CALL 800-AVALON1 (800-282-5661) or 602-790-4214 outside the US FAX 602-790-6307

News Shorts

Too many standards?

Efforts to expand emerging "fast Ethernet" technology to Token Ring networks heated up last week when IBM and Hewlett-Packard Co. said they will jointly promote a standard called 100VG-AnyLAN. The idea with the higher-speed versions of existing LANs is to breathe more life into today's LAN investments in advance of higher-bandwidth switching technologies. While IBM and HP said they will submit technology to the IEEE 802.12 committee, formed recently to develop one of two existing versions of fast Ethernet, a similar Ethernet/Token Ring effort from Proteon, Inc. announced in August will be taken up by the 802.5 Token Ring standards body.

Microsoft to integrate PCMCIA software

SystemSoft Corp. has signed a deal that lets Microsoft Corp. integrate its PCMCIA software into future operating systems. When coupled with this type of software, an operating system gains more reliability and higher performance. The SystemSoft PCMCIA software, called CardSoft, is made up of driver files that automatically load when a PC powers up. Through the agreement, Microsoft hopes to speed user acceptance of PCMCIA and also help move its Plug and Play initiative for Windows.

IBM lab director switches gears

Guy Harrison, formerly head of IBM's Poughkeepsie, N.Y., laboratory where the MVS operating system lives, has moved to the Personal Software Products Group in Austin, Texas, to take charge of development for Workplace OS. That is the code name given to IBM's graphical user interface that will straddle OS/2, DOS and Unix platforms. Harrison made the move to ensure the software will reflect the bulletproof nature of MVS, an IBM spokesman said.

Computerland to sell distribution unit

In a move that some have suggested signals the end of the reseller channel as it has been, Computerland Corp. agreed to sell its franchise and distribution division to Merisel, Inc. for as much as \$110 million. Merisel would gain Computerland's profitable franchise division, its Datago distribution arm and the rights to the Computerland name. Computerland retains its company-owned stores and its service arm, and, with a \$60 million up-front cash payment, will end its status as a "thinly capitalized" company.

UPS Canada goes cellular

United Parcel Service, Inc. activated Canada's first nationwide cellular data transfer network last week, designed to provide UPS customers with the ability to receive immediate information on the status of their packages. UPS created the cellular system in a strategic alliance with Mobility Canada, a corporation formed by BCE Mobile Communications and Bell Mobility Cellular.

SHORT TAKES Kenneth Thome, vice president of information systems at General Mills, Inc. in Minneapolis, was promoted to senior vice president of financial operations, replacing Tom Nelson, who retired... The Ultimate Corp. in East Hanover, N.J., has changed its name to Allerion, Inc. and will focus on re-engineering consulting and other services... Motorola, Inc.'s Paging and Wireless Data Group said it would develop a wireless handheld computer that uses Microsoft's At Work software... Storage Technology Corp. said its third-quarter results will be "below expectations" and that it will take a onetime charge of \$80 million for restructuring.

News shorts, page 16

LANServer plans hopeful but far off

By Elisabeth Horwitt AUSTIN, TEXAS

IBM is grooming its OS/2 LAN Server for the global network services environment that corporate users are increasingly demanding and rival network operating system companies are already providing.

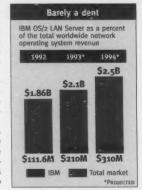
The first major step in this direction will come in a few weeks when IBM unveils LAN NetView, a package providing management of distributed LAN Server systems and various clients via either host or OS/2-based NetView, according to Art Olbert, director of IBM's Personal System Group.

Like Novell, Inc.'s NetWare Management System (NMS), LAN Net-View will manage devices via Simple Network Management Protocol, Olbert said.

And like distributed NMS, which Novell is expected to announce Oct. 4, LAN NetView can distribute management of local network systems out to LAN Servers, which can then send key information to LAN NetView, or host NetView, according to Olbert.

The ability to manage distributed LAN Server networks from host NetView is a key capability, users said. The Automobile Club of Southern California, for example, has a "very demanding environment" consisting of LAN Server and diskless PCs, said Steve Nees, supervisor of office systems at the automobile club. "We want to manage that environment remotely from NetView over our existing SNA network. LAN NetView sounds very useful."

Unfortunately, other key enter-



prise LAN Server services, such as the Open Software Foundation's Distributed Computing Environment-based global naming, directory and security, are still in the pre-Alpha stage, Olbert said.

Tardy delivery of such services could hurt IBM in the crucial market window of 1994, when Banyan Systems, Inc., Microsoft Corp. and IBM will be competing for those shops that are still defining their client/server strategies, analysts said. Prospects of prying Novell loose from its huge installed base appear slim.

"IBM is trying to gain recognition that it is a player [in the client/server market], that it hasn't disappeared and that it has some advanced products coming out," said Lee Doyle, director of LAN Research at International Data Corp., a research firm in Framingham, Mass.

But future growth for the IBM OS/2-based network operating system will depend on the timely delivery of the above cited services on a par with Novell's and Banyan's offerings, he added.

Indeed, strong enterprisewide naming services and wide-area connectivity were main reasons why Vines and not LAN Server became the primary platform for New York agencies in the past couple of years, said Sam Blumenstyk, director of LAN consulting for the city's Computer and Data Communications Services Agency.

Microsoft

CONTINUED FROM PAGE 1

for the MS-DOS and OS/2 operating systems will be available at no additional charge to all its networking customers, including users of LAN Manager, Windows NT and Advanced Server. Previously, customers had to pay \$179 per fiveuser copy of Microsoft's NT client software.

The price break really makes a difference for large corporate customers, which will be able to save \$35,024 for 1,000 users on Advanced Server installations as a result. Companies can now buy an unlimited-user version of NT Advanced Server for an introductory price of \$1,495, which will jump to \$2,995 in March, Microsoft said.

Novell does not charge for client software; however, its NetWare pricing structure is tiered according to the number of users that a given server can support. A 1,000-user version of NetWare 4.01 is priced at \$47,995.

Microsoft's new pricing will certainly weigh in as a factor in how widely the National Immunization Program eventually decides to implement NT Advanced Server, Kahn said. However, it will probably not make a big difference in the program's commitment to Net-Ware, he added. "We already have the financial investment in Novell."

A more fair cost comparison would be one between Advanced Server and UnixWare, Novell's Unix-based application server, Novell spokesman William Donohoo said. "NT does not compare with NetWare 4.01" because the former lacks key network services such as global directory and authentication, he said. The server edition of UnixWare is priced at \$1,299 for an unlimited number of users.

Could reach 10%

If Microsoft's pricing structure is successful, Advanced Server market share could climb to 10% next year out of a total worldwide network operating system market of \$1.8 billion, said Bob Flanagan, a senior analyst at WorkGroup Technologies. This year's market totals \$1.5 billion, he added.

While Novell is "always looking at its pricing," the vendor has perceived no user unrest about Netware's current pricing structure, Donohoo said. However, Novell is likely to respond either with price changes or legal action, such as a charge of anticompetitive pricing against Microsoft, if NT Advanced Server starts cutting into its revenue next year, Flanagan said.

NT redirector

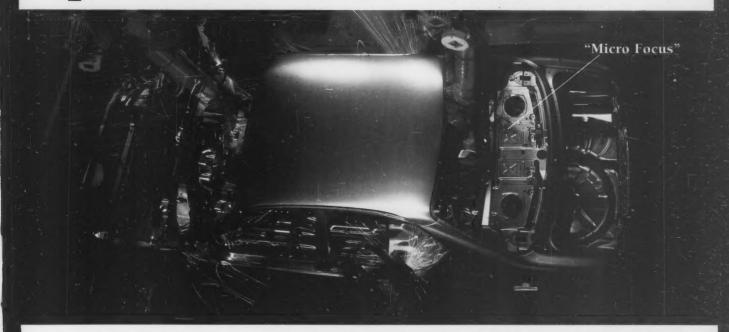
Claiming that Novell was taking too long to deliver a jointly developed NetWare redirector for Windows NT, Microsoft has come up with its own redirector.

Novell has for some time offered a prerelease version of the redirector on Internet and ConpuServe. However, the release is missing key pieces such as IPX support for Winsockets, DOS and Windows virtual clients on NT and support of the Net-Ware 4.01 global directory, a spokesman conceded.

Directory and Winsockets support will appear in the general-release version slated for delivery early next year; however, DOS support may come later.

Microsoft's version will provide full NT client support as well as Token Ring support, which Novell's release lacks, a Microsoft spokesman said. Microsoft plans to release a beta version of its redirector within 30 days.

When America's largest automakers develop new Rightsizing solutions, who puts them on the line?



It's the Micro Focus assembly line: complete solutions designed to drive business application development into the next century.

In fact, eight of the top ten companies in Computerworld's Premier 100*, the country's most efficient users of computer technology, develop applications with Micro Focus products.

America's top automobile manufacturers have put the Micro Focus Downsizing and Rightsizing Solutions to work. Downsizing applications as diverse as product scheduling, tooling, manufacturing quality control and dealer support. They are delivering information on hardware platforms that offer significantly higher performance levels at less cost.

With Micro Focus solutions, mainframe CICS," IMS," DB2° and even 370 Assembler-based systems can be brought off the host without change, providing users with the industrial-strength reliability of the mainframe code with the price/performance benefits of the latest architectures.

Downsized applications can then be quickly tied into the corporate information infrastructure with client/server solutions that alleviate the problems of merging old code with new technology, the intricacies of communications programming and the challenge of delivering full function GUIs.

But then, Micro Focus solutions have been proven in the most demanding environments. From downsizing and rightsizing applications, offloading mainframe development and client/server computing to crossplatform and PC applications.

So, today, when you see the world's leading corporations turning software development into productivity, chances are Micro Focus is in the picture. For more information on putting the Micro Focus Rightsizing Solution to work for you, call 800-872-6265.

MICRO FOCUS

HP users still stung by order processing, support snafus

Company says remedies on way

By Mark Halper SANFRANCISCO

Hewlett-Packard Co. may indeed have replaced Digital Equipment Corp. as the country's secondlargest computer vendor, but it has done so despite a couple of lingering internal nemeses.

At a user conference resonant with mea culpas from Chairman Lewis Platt and other HP executives last week, HP conceded that overhauling its archaic order fulfillment system has proved more difficult than expected.

"One of my Top 3 goals is to fix order fulfillment," Platt told an audience at his keynote address at Interex, The International Association of Hewlett-Packard Computer Users meeting.

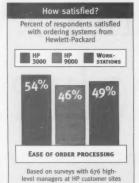
Revising last year's prognosis of improving the system by this time. Dick Love, vice president of order fulfillment and manufacturing. said, "We're expecting to see acceptable performance within the next few months, industry parity

within a year and a leadership po-

sition within two to three years.' Furthermore, HP executives acknowledged, the company's sales response effort is lagging. Manuel Diaz, worldwide computer sales and marketing general manager, cautioned that users cannot expect the type of attention they received prior to HP's work force reductions

That point is already apparent to some HP users. During an open microphone session, James Ouellette, director of management and information systems at Connecticut Attorneys Title Insurance Co. in Rocky Hill, Conn., described his HP sales support as "a nightmare. We went from seven salespeople to not seeing [any] for two years.

Although HP promised at last year's Interex conference to make significant order fulfillment strides by the time of this year's meeting, Platt issued a bleak progress report. "We're just now getting a handle on how hard this is," he said.



e: Interex 1993 Strategic Interest Survey

And as the challenge daunts them, the issue haunts them. Users have been complaining that HP's creaky order fulfillment system slows down delivery as well as price quotes beyond acceptable levels [CW, March 29].

According to survey results Interex issued last week, users gave order processing low marks (see chart). In contrast, users gave hardware satisfaction ratings ranging from 98% to 100% and software satisfaction ratings of 83% to 93%.

Earlier this year, Platt reassigned Love to devote full-time attention to the problem. "The competition can turn around a quotation faster than we can," Love said. "Our time is days. We'd like to see it in hours or seconds.'

Chuck Piercey, Interex executive director, explained that HP runs a mishmash of order fulfillment operations designed to support separate businesses within HP that now sell to mutual customers more than in the past.

One of the keys to the forthcoming system is an electronic quotation and components configuration program under development called Conquest. Beta versions of Conquest, co-developed with Trilogy Development Group are installed on HP 9000s at about 10 sites worldwide

Invisible reps

Meanwhile, HP customers are still smarting from sales support cutbacks. Some customers were switched to phone sales, and many have complained that they never see their representatives and that they have trouble reaching them.

This problem has cost HP some customers [CW. April 12], Lawrence Simonsen. MIS manager at Springville, Utah, valve maker Valtek, Inc., announced at the open mike session that this Interex conference would be his last because his firm is switching to NCR Corp. equipment. Simonsen faulted HP salespeople for failing to meet with Valtek's chief financial officer.

Diaz said the company is working to provide a higher level of sales support but cautioned that because of economic conditions, "it will not be the same level of service as in '91 - no one can do that."

Prepared to change its mind

ith an eye toward staving off possible customer defections, Hewlett-Packard Co. last week asked users if they want its proprietary Image/SQL database ported to the Unix-based HP 9000.

HP posed the question - one of several in a survey the company issued to users at Interex (see story at left) - just one year after it told customers that such a move would require a large software effort and that the system's performance would be substandard, acknowledged Rich Sevcik, HP's minicomputer chief.

Some users said HP, healthy as it is, is concerned that users of its MPE-IX-based HP 3000 who migrate to Unix may choose platforms other than the HP 9000 Unix box, which runs HP/UX.

Image/SQL is tailored for MPE-IX (see story page 85), and if a user migrating to Unix could easily load existing database applications onto HP/UX, he would be more inclined to stick with HP rather than find another Unix vendor

Seveik claimed that HP does not have a defection problem. He cited a Cowen & Co. report that said 97% of HP 3000 users from last year are still running that machine this year

He noted, however, that "by the nature of the computer industry, you always have to have the mind-set of 'How will I keep my customers?'

HP already offers an HP 9000 database. Allbase. but markets it in a low-profile manner while it cooperates with database competitors such as Oracle Corp. and Sybase, Inc. to fine-tune their more popular databases on the HP 9000.

Adding Image/SQL to the HP 9000 fold could disturb the balance HP now has with third-party vendors.

Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco, suggested that the same type of sensitivity may explain why HP took a low-profile posture last week with another database announcement: IBM's DB2 will soon run on the HP 9000. The move comes a little over a year after IBM said it would make CIS available on HP 9000s. - Mark Halper

Wellfleet

CONTINUED FROM PAGE 1

said Al Candela, vice president of data planning at Chemical Banking Corp. in New York

Since the bank has about 20,000 IBM terminals, "this means more than a little to us," he said. Today, on the LAN side of the house. Chemical runs a source-route bridged Token Ring internetwork and has "tremendous problems with broadeast storms," an infamous issue with the technology.

Candela said he anticipates that after some heavy prototyping, Data Link Switching could usurp the bank's source-route bridging infrastructure.

Meanwhile, the heightened status of the VME-based boxes is "a good thing: capital G, capital T," said John Scoggin, supervisor of network operations at Delmarva Power & Light Co. in Newark, N.J., which uses the older line.

"In Release 7.6, we'll finally get all the goodies that the Backbone Node people have always taken for granted," he said. Scoggin is particularly motivated by

the software fault tolerance achieved by Wellfleet's design of distributing protocol stacks, management and other processes out to indi-

vidual LAN modules rather than centralizing the function in a potential single point of failure.

One reason is that Delmarva has just completed its LAN internetwork, "All our customer service is now totally dependent on our routed backbone," he said.

Other Wellfleet Release

7.6 highlights include the following: • The ability to manage Wellfleet routers from IBM's LAN Network Manager and thus from NetView. Candela said this al-

Wellfleet's Release 7.6 represents the first box on the market to support Data Link Switching, the emerging industry standard scheme for merging SNA traffic onto distributed internetworks.

First to market

tems staff a view of the router network. ·Incorporation of Madge Networks, Inc.'s Fastmac Plus technology, which Wellfleet said will double its Token Ring

lows his SNA-oriented information sys-

internetworking performance.

• Schemes that reduce broadcasts in source-route bridging networks.

· Backward porting of such Backbone Node features as the standard Point-to-Point Protocol for router interoperability across wide-area networks and support of Banyan Systems, Inc.'s Vines IP traffic.

Vines support is important to Scoggin, who currently encapsulates Vines in

Internet Protocol (IP) packets across the wide area via a function in his Banyan servers that "eats a lot of horsepower. We'll eliminate that.'

Also, having one set of source code for all platforms means that customers using both Wellfleet product lines will gain interoperability between both environments with these and all other functions. •An Asynchronous Transfer Mode (ATM) Data Exchange Interface, which defines how local ATM cells are placed on a wide-area leased line.

·Enhanced traffic prioritization and more flexible dynamic load-sharing schemes that allow bandwidth to expand and contract upon user request to accommodate different types of traffic.

· Support for AppleTalk protocols over frame relay and Switched Multimegabit Data Service WANs.

The new release is "so comprehensive, my first reaction is, 'why didn't you call it Release 8.0?'" said Michael Howard, president of Infonetics Research, Inc., a consultancy in San Jose, Calif. There is such a bulk of improvements, he said, Wellfleet "might have missed a chance here, positioning-wise."



"If interoperability was just about connecting data with applications, implementing enterprise client/server would be easy. It's getting them to work together without losing performance or functionality that keeps you up at night. And to solve it, you have to ..."





Mark Page knows the situation well.
Vice President of Connectivity Products
at Sybase, he's helped a long list of
customers develop integrated solutions
to one of the most significant problems
in client/server computing. He shares that

experience in a taped conversation "Making Connections In Client/Server Computing." For your copy, call 1-800-SYBASE-1.

Novell to move UnixWare to fore

By Elisabeth Horwitt NEWYORK

■ Novell, Inc. detailed plans last week for moving UnixWare onto the front burner of users' client/server strategies, saying it will provide tighter integration with NetWare global services. The company also promised to provide OEMs with UnixWare in binary and source code form starting in the fourth quarter.

In addition, Novell announced a Unix-Ware-compatible certification program and expanded its Certified NetWare Engineer program to include UnixWare.

The idea is to make UnixWare and Net-Ware into an integrated "matched pair." NetWare will be the network services platform and will support applications in smaller sites that do not want UnixWare. Meanwhile, UnixWare will act as the scalable robust server for mission-critical corporate applications, said Kanwal Rekhi, executive vice president of Novell's Unix Systems Group.

Novell's decision to bundle NetWare services and updates into the UnixWare source code free of charge will be a costly but probably effective way for the company to jump-start its Unix system into the volume-shipped, shrink-wrapped deskton and server markets, said Bob Gill, a director at Gartner Group, Inc., a Stamford, Conn., research firm.

The integration of NetWare and Unix-Ware in source code form "will speed our time to market and let us concentrate on adding value," a Data General Corp. spokesman said.

The source code will conform with X/Open Co. standards and a common Unix application programming interface (API) that will allow Unix applications to run over multiple Unix variants. A 75-

vendor consortium agreed to support the API by mid-1994 [CW, Sept. 6].

In addition, Novell's support of X/Open and its expected future move of turning the UnixWare brand name and interface over to the standards body [CW. Sept. 20] should reassure OEMs, independent software vendors and users alike that the system is a true open standard and not a proprietary Trojan horse that will put them under Novell's control, analysts and vendors said.

Novell Chief Executive Officer and President Raymond Noorda confirmed last week that Novell is working toward this but would not provide a time frame.

Rollout specifies

Through a product rollout slated to start in mid-1994, Novell will provide the fol-

·A utility that maps between UnixWare and NetWare directories, enabling users

to access both types of servers transparently across the enterprise.

 NetWare Management System services for UnixWare.

·Software licensing administration and centralized software distribution across both platforms.

·Extension of AppWare, Novell's multiclient/server application development environment, to UnixWare clients and eventually to UnixWare servers.

·Integration of the two platforms via Network File System and TCP/IP.

Still missing was a firm Novell commitment to Distributed Computing Environment (DCE), the Open Software Foundation's standard for distributed Unixbased computing.

"DCE is still not in high demand." said Michael DeFazio, a Unix Systems Group vice president, "As it evolves, we'll support it in UnixWare and NetWare, primarily through third-party partners.

Novell's focus for integrating Unix-Ware and NetWare will not be DCE but TCP/IP and NetWare services, DeFazio said.

Unix trademark switch on hold

By Jean Bozman NEWYORK

It was a near miss.

Despite high expectations throughout the Unix community that Novell, Inc. would announce its decision to turn over Unix System V Release 4 source code to X/Open Co., the Orem, Utah, networking giant stopped short of doing so at last week's Unix Expo.

Indeed, Robert Davis, vice president of marketing at Novell's Unix Systems Group, alluded to political wrangling as he described the lastminute talks with key Unix players to reach agreement on the trademarking move: "In an

effort to move this thing forward, to make it happen by Unix Expo, we ran out of time

Deal was real

Novell's discussions were for real, vendors affirmed."They are looking to take the name outside, said Ron Bell, chief technology officer at Data General Corp., one of the System V Release 4 licensees

In fact, Novell came so close to striking an accord that several Unix vendors said they arrived at Unix Expo with press releases of support in hand and were surprised when the trademarking move did not materialize.

Users were also disappointed because a "branding" of standard Unix could cut application development costs and improve application portability among hardware platforms. But some said they are already satisfied with a wide-ranging Sept. 1 agreement among Unix vendors to support a set of more than 1,100 common application programming interfaces (API) certified by X/Open.

The talks started in July, when Novell acquired Unix System Laboratories, Inc. (USL), which owned System V Release 4. Davis still expects an agreement, but he would not say when it would be reached.

Instead of making the expected announcement, Novell officials used the show to make clear their intention to work with an industry body such as X/Open to handle Unix compatibility and trademarking [CW, Sept. 20] but provided few details.

Fine-tuning first

Pros and cons of Unix

branding by X/Open

Reduces development costs.
 Promotes vendor compliance

CONS could slow Unix evolution.

· Discourages vendor-specific

Limiting proprietary extension would hurt profitability.

Vendors may balk at adopting "standard" Unix code from Novell.

May overburden X/Open, which already brands XPG4 and Motif.

May reduce the number of Unix

with X/Open standards

"flavors."

Source: X/Open Co.

· Easy for users to find PROS compatible software.

Boosts interoperability.

· Compliance testing

Davis said the company "absolutely believes that a single interface of Unix is important,"

while Novell officials hinted that the company would rather provide a "finished" version of Unix, such as Novell's UnixWare, for branding, than hand over only the Unix System V Release 4 source code.

Analysts predicted that vendors such as Sun Microsystems, Inc. or IBM which supply the Solaris and AIX operating systems, respectively - would probably balk if Novell tries to brand its UnixWare implementation of System V Release 4 as an industry stan-

Sun Chief Executive Officer Scott McNealy said he would endorse a Novell

move to brand its Unix interfaces through X/Open. But he asserted Sun's right to make building or buying decisions about finished Unix implementations such as UnixWare.

Unfortunately, what Noorda did was buy the **FUSL1** brand name because he didn't have a lot of implementation horsepower. I would like to see the USL team create some compelling technology for an open interface and allow us to make a buy decision," McNealy said.

HP offers full Corba implementation, finally

By Melinda-Carol Ballou

NEWYORK

Hewlett-Packard Co. last week unveiled an implementation of the Object Management Group (OMG)'s Common Object Request Broker Architecture (Corba) that uses the Distributed Computing Environment (DCE) from the Open Software Foundation as its transport mechanism.

Corba includes a language for describing application interfaces as well as dynamic and static application programming interfaces for accessing objects across the network. It acts as a kind of object traffic cop. offering directions to enable software existing on a network to communicate with software elsewhere

Although HP was one of the first to contribute to the Corba specification, it is one of the last to ship a full implementation of the standard.

HP's ORB Plus includes its Distributed Object Management Facility (DOMF), object services, development and administrative tools and sample applications. HP is now combining DOMF with IBM's Distributed Systems Object Model to allow developers to create applications that are scalable, interoperable and portable across HP and IBM platforms. Both companies will comply with an interoperability standard for Corba that

the OMG will establish in the first half of 1994

HP users said they enthusiastic were about the release of ORB Plus, which is now beginning to ship to users via an early release program and will be generally available with a developer's kit in the first half of 1994.

The University of California at Davis (USC) is hoping to use

HP's ORB Plus uses DCE as its transport mechanism. It is integrated with DCE through DCE's remote procedure call and naming services. Applications Encina* Corba Encina services Operating system

Object of desire

the technology to create network-based multimedia applications, according to Turnando Fuad, a computer resource manager at USC's Center for Image Processing and Integrated Computing.

Fuad said he is interested in the links to DCE as a way to connect ORB Plus applications with DCE-compliant platforms.

Pricing for the ORB Plus developer's kit will be made available when the product ships

Reporter's

Notebook

The Common Open Systems Environment (COSE), an ad hoc vendor group attempting to accelerate commonality among Unix environments, held its first systems management subgroup meeting last week to begin reviewing requirements for Unix systems. It is still unclear whether COSE will adopt systems management interfaces from a slew of vendor packages or support the best-of-breed features within packages supported by the Open Software Foundation (OSF). Unix International and other leading systems management vendors. Sources said COSE may make an announcement by late November.

In the meantime, Computer Associates will submit to COSE APIs from its CA-Unicenter for Unix systems management package by mid-October, according to Alfred H. Novissimo, CA's vice president of research and development. Novissimo and other executives close to COSE said they were unsure when the group planned to decide on the systems management format.

Tivoli Systems in Austin, Texas, last week extended support for its Tivoli Management Environment framework to IBM's RS/6000 and SunSoft's Solaris 2.3 and unwrapped Tivoli 1.6. The upgrades will ship in December. Tivoli 1.6 will support new print management and E-mail management applications.

SunSoft last week introduced Solaris 2.3, its fourth release of Solaris 2.X since the operating system was first announced in June 1992. Solaris 2.3 will reportedly feature better support of Network File System (NFS) networking applications, as well as support for the Sun XIL imaging library for multimedia applications and the Wabi interface for Windows-based software running under the X Window System. Solaris for clients is priced at \$795; server versions are priced from \$1,995.

Unify announced Unify Vision, a crossplatform, object-oriented graphical tool for creating client/server applications targeting a range of RDBMSs. Its Smart-View architecture acts as an intelligent interface to the specific databases and allows developers to build complex applications on Windows-based PCs or Unix workstations.

NCR unveiled 3534 XLA X-Station, which includes NCR Telnet 3270 local terminal emulation software to connect to IBM mainframes. The 3534 succeeds NCR's 3533 X-Station and also features a standard 25-MHz RISC processor upgradable to a 33-MHz turboprocessor. It will ship in the fourth quarter with prices starting at \$4,195.

Micro Focus and Transarc said they have integrated the former's Cobol wrap-

pers with the latter's Encina on-line transaction processor (OLTP) product. This will let Cobol programmers use Encina to create distributed transaction processing applications for Unix. Micro Focus said it will work with Sybase to develop an interface for linking Cobol applications with Sybase's SQL Server. Micro Focus also announced its transaction system for Solaris, an OLTP system that supports CICS and non-CICS applications. In addition, IBM will start shipping

in December Micro Focus tools for Cobol development on AIX platforms along with IBM's Workbench tools.

In other news, the OSF has released the first "snapshot" of its OSF/1 Release 1.3 source code and said it will submit its Unix System V Release 4-compatible Calvin test suite to the X/Open Co.... Tandem replaced Mips Technologies' R3000 RISC chips in its Integrity line of fault-tolerant Unix computers with

R4000 RISC processors. Tandem also agreed to resell Silicon Graphics Unix computers....Sun officially announced its SPARCcluster 1 NFS file server, which is a cluster of up to four SPARCserver 10 systems [CW, Sept. 13].... Sapiens International announced its own Sapiens Vision for HP/UX, an object-oriented tool for rapid development of client/server applications originally developed by Smartstar. Sapiens completed its merger with Smartstar in July.

ntroducing **COBOL Source Analyst...** the greatest advance in **COBOL** programming since the Post-It™ note! From within SPF/PC°, run CSA and select Views to access your viewing options Paragraphs Only provides an outline of the entire program for rapid familiarization Selectively add PERFORMS. Conditions and Comments to analyze program logic With Auto Navigation you can follow program logic interactively without paper listings Display Branch Path keeps track of your logic path COBOL Source Display Full Path provides all Analyst running in a statements in this path Windows 3.1 DOS session

COBOL Source Analyst (CSA) is a new, fully interactive productivity tool that allows you to quickly analyze complex COBOL source code directly from SPF/PC! With CSA you can follow your logic paths on

the screen, without using Post-It notes, paperclips or all 10 fingers! And you can do it all from within SPF/PC! CSA supports VS COBOL II, OS/VS, Micro Focus, CA-Realia, ANSI-74 and ANSI-85.

Now for a limited time, the new COBOL Source Analyst is available for \$149, saving you over 60% off the \$395 list price! Hurry, call now and experience the greatest advance in COBOL programming since the Post-It!

Command Technology Corporation, 1040 Marina Village Pkwy., Alameda, CA 94501

Call 800-336-3320 or 800-648-6700 to order CSA!

COBOL Source Analyst is a trademark and SPF/PC and CTC are re-

News Shorts

Massively parallel machine to debut

Next week in Washington, D.C., Cray Research, Inc., will unveil its long-awaited massively parallel processor system, the T3D. Cray declined to provide details about the T3D that is based on Digital Equipment Corp.'s Alpha chip. Analysts said they believe the T3D will eventually scale from tens to at least 1,024 processors. T3D's pricing is expected to start in the single-digit millions; the high-end machine will be priced between \$25 million and \$30 million.

Health reform eyes electronic Rx

President Clinton last week sketched out his plans for health care reform, which include an emphasis on reducing paperwork and developing data interchange standards for electronic billing [CW, Sept. 20]. A proposed National Health Board would develop standards for electronic billing and for a nationwide information network that would collect data on the quality and cost of health care. However, sources said Clinton advisers were unable to decide on a patient identification numbering scheme [CW, Aug. 9].

WordPerfect outlines Unix, other plans

As expected, WordPerfect Corp. last week announced WordPerfect Office for Unix running on Sun Microsystems, Inc.'s Solaris 1.0. Other Unix versions are due out in the first quarter. WordPerfect also said it plans to run its namesake word processing package on RS/6000 systems based on the PowerPC architecture. Finally, WordPerfect announced a promotion deal with Borland International, Inc. under which WordPerfect will bundle Borland's Quattro Pro 5.0 WorkGroup edition with WordPerfect 6.0 of Windows for \$525 through December.

Routers to work with Novell NMS

Stonybrook Services in Bohemia, N.Y., last week announced Router Manager for Wellfleet, software said to manage Wellfleet Communications, Inc. routers from Novell, Inc.'s NetWare Management System (NMS). The first release will be a Windows-based snap-in application that allows users to view Wellfleet routers as icons and launch Wellfleet's management application from the NMS graphical user interface. The three companies are working on tighter integration with NMS in the future. Router Manager for Wellfleet is shipping now for \$1,995.

Borland gives support new twist

Seeking to make itself more attractive to information systems departments, Borland this week will unveil its Borland Advantage program. The service and support plan differentiates Borland from its rivals by factoring an average usage estimate into site licenses and also by factoring in the installed base of Borland software. The firm will also launch Borland Assist, a standard program available to users for free. It has two other paid support programs that offer varying levels of service.

SHORT TAKES As expected, the IBM PC Co. last week announced new PS/2 Server 85s and 95s. The servers use a design called SynchroStream, which moves data at full bandwidth to each subsystem to circumvent the major throughput bottlenecks.... Micrografx, Inc. last week named Gordon M. Tucker president and chief executive officer. Tucker was most recently vice president of strategic development at PepsiCo, Inc.'s KFC Corp. subsidiary... Adobe Systems, Inc. last week announced a \$11.4 million profit on sales of \$78.8 million for its third quarter, ended Aug. 27... IBM last week announced FlowMark, an OS/2 object-oriented work-flow package.

IBM shows PowerPC systems

By Jean S. Bozman

IBM has used its PowerPC and Power2 RISC chips in a sweeping renewal of its nearly 4-year-old RS/6000 line of Unix workstations and servers announced last week.

The unveiling of three desktop workstations and a server based on the IBM/Motorola, Inc. PowerPC 601 chip at Unix Expo marked the beginning of IBM's use of that high-performance technology (see chart).

The three high-end servers based on IBM's Power2 chip reportedly provide more than twice the performance of the first generation of Power RISC chips.

IBM also announced an X Window System terminal, a new version of the AIX 3.2 operating system and availability of the highend SP1 Powerparallel Unix processor, announced in February.

AIX 3.2.5 supports the Visual System Manager distributed systems management tool and a new X.500-compatible global directory. It includes C, C++, Fortran and Cobol tool kits for building Unix applications.

More aggressive?

Despite all the upgrades, some users said IBM is still not pushing open systems aggressively. "But I expect that to change," said David Trevino, computer technology director at the Instituto Tecnologico de Monterrey in Monterrey, Mexico, "because the solutions are more competitive, and you can get better value for your money."

Industry analysts said IBM's PowerPC-based systems will put Intel Corp. on notice that IBM intends to make a comeback in the high-volume PC and workstation markets. IBM officials said the 601-

based systems run almost twice as fast as Intel's 66-MHz I486 PCs and have about the same performance as Pentium-based systems.

IBM's Power Personal Systems division will come out with lowcost PC implementations of the PowerPC chip in the first half of 1994, said Bill Filip, president of IBM's Advanced Workstations and be added until 1994, he said.

Even so, some IBM RS/6000 users said they are waiting for lowend and laptop PowerPC/AIX models to add mobility to the line of deskton and deskside machines.

"We plan to put maps on laptops with a [geographic information system] for people who work out in the field," said Martin Bartel, a se-

Chip off the old block

SAMPLING OF IBM RS/6000S BASED ON THE POWERPC CHIP

Desktop workstations	Processor	Memory	Storage	Price	Ships
Powerstation 25T	PowerPC 66 MHz	16M bytes	540M bytes	\$9,395	10/15/93
Powerstation/ Powerserver 250			2G bytes	\$5,445	10/15/93
Servers					
Powerstation/ Powerserver 58H	Power2 55 MHz	64M bytes	2G bytes	\$64,450	10/22/9
Powerserver 990	Power2 71.5 MHz	128G bytes	(4) 1G byte	\$127,100	10/29/9

Systems division in Somers, N.Y, this should apply further pressure to Intel-based systems. Workplace OS, the first operating system written to take full advantage of the PowerPC, is due out in the first half of 1994.

The RS/6000 systems' broad power range is intended to address a wide variety of applications, said Tom Jarosh, director of advanced workstations at IBM's Advanced Workstations and Systems division. Low-end PowerPC models may take the place of inexpensive PCs or terminals, he said, while midrange and high-end models will be departmental and corporate file servers.

But a modular version of the AIX operating system called Scalable AIX, which would, for example, cut system overhead in half for AIX Lite laptops [CW, Aug. 30], may not

nior engineer at Northeast Utilities, a group of five New England utility firms. The Berlin, Conn., site where Bartel works has nine RS/6000s, he said.

However, Tadpole Technology, Inc. in Austin, Texas, which built the AIX laptop around a PowerPC 601 chip for IBM, demonstrated a working model complete with a rubber mouse used in IBM's Think-Pad portable.

The portable system, scheduled to ship in the first half of 1994 and priced close to \$10,000, was running a 50-MHz version of the 601 chip under AIX 3.2.5. It had 16M bytes of RAM expandable to 64M bytes, a 210M-byte hard drive and VGA color display using thin film transistor technology. The system also supports PCMCIA cards.

Senior editor Ed Scannell contributed to this report.

Lotus unveils Unix for Solaris 1.0

By Michael Vizard NEW YORK

■ Lotus Development Corp. teased Unix Expo show-goers last week with a glimpse of its Unix implementation for Notes when it officially introduced a forthcoming Notes for Solaris 1.0 system from Sun Microsystems, Inc.

Due in the fourth quarter, the Notes implementation for Sun systems is aimed at integrating Sun's installed base with the Notes environment. Lotus will not eatch up to Solaris 2.0 until it ships a compati-

ble version of Notes next year.

Lotus' schedule for other Unix implementations, which are targeted at systems from The Santa Cruz Operation, Hewlett-Packard Co, and IBM, has slipped into the first quarter of 1994.

"I'm not surprised. Lotus is notorious with its delivery timetables. I take them all with a grain of salt," said Norman Weizer, president of Weizer Associates, a consultancy in Lexington, Mass. Lotus has been talking publicly about a Unix implementation of Notes for about 18 months.

The arrival of Notes will be welcome news for sites that use Unix as their primary platform. "Right now, a lot of people have 08/2 systems that are used to just run Notes," said Antonio Parham, a Lotus product manager. "They'd like

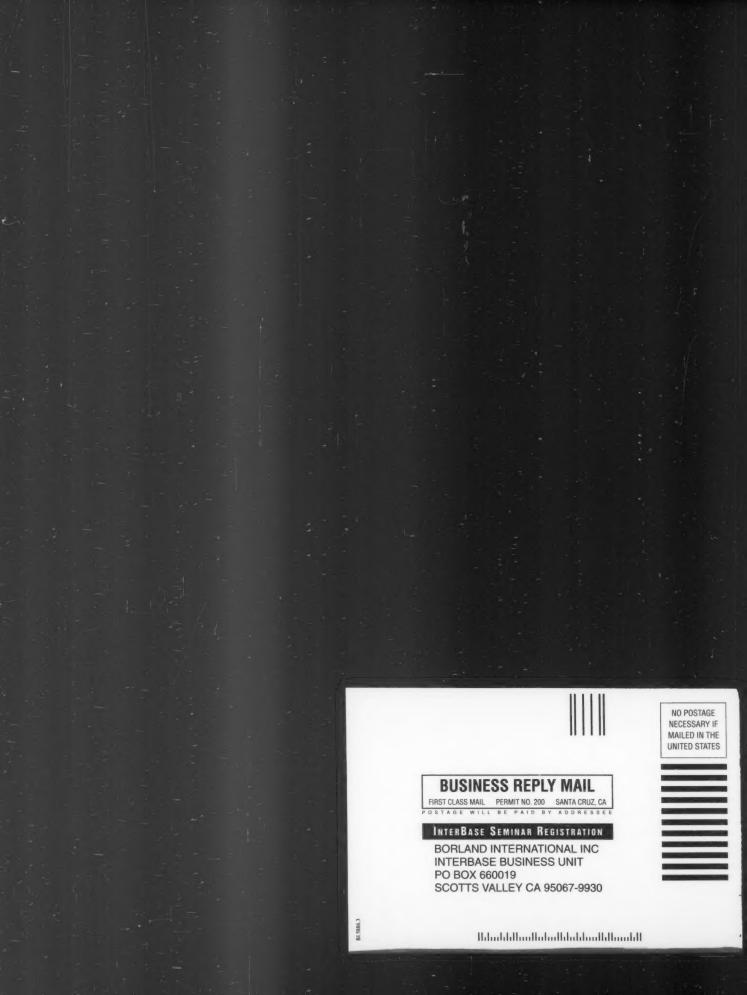
to put all their applications on the same server."

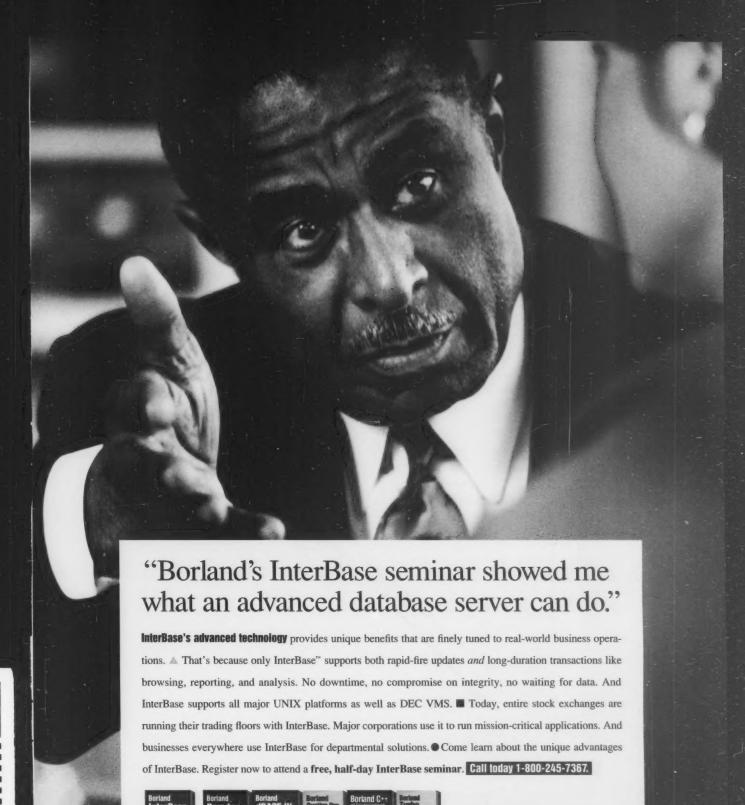
According to Parham, Notes on a SPARC platform will give users access to a RISC platform that supports more physical memory and better I/O performance to run Notes. However, Solaris 1.0 does not support symmetric multiprocessing, which would allow Notes sites to begin consolidating servers by running multiple Notes databases on the same system.

Symmetric multiprocessing will be supported on IBM's AIX, HP's HP/UX, Solaris 2.0 and Microsoft Corp.'s Windows NT platforms in 1994, according to George Gilbert, a Lotus marketing manager.

Meanwhile, Lotus said it plans to launch Notes as a NetWare Loadable Module at Networld Dallas '93 next week.

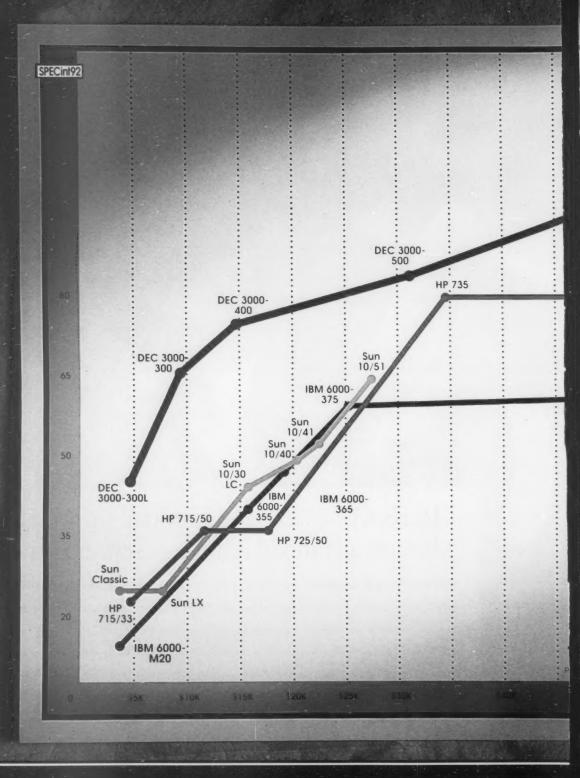
YES! I want to	attend the nex	t free, half	day Inter	Base seminar	in my area
InterBase*		Name			
		Title			
To register for a seminar, fill out th		Company			
Borland International, Inc., P.O. B Scotts Valley, CA 95067-9930.	ox 000019	Address			
Or call 1-800-245-7367 for more in	nformation.				
Register me for the sen	ninar I've checked			State Zip	
I can't attend a seminal		Phone () _		Fax ()	
me product information		3. Please sign me	up for the follow	ring morning seminar.	
1. Our computing environment inc	ludes	Atlanta, GA	Dallas, TX	New York, NY	Torrance, CA
(please check all that apply):		October 8	October 13	October 7	October 14
DEC DG AVIION	HP Apollo	Boston, MA	Detroit, MI	☐ January 26	G February 4
☐ HP ☐ IBM RS/6000 ☐ Sun ☐ Silicon Graphics	☐ SCO ☐ DOS/Windows	October 6	October 19	San Francisco, CA	Washington, Do
Other Silicon Graphics	☐ Windows NT	January 25	February 1	February 8	October 5
		Chicago, IL	Houston, TX	Santa Clara, CA October 15	Raleigh, NC
2. We plan on making a database p		Getober 12 February 2	Tampa, FL	October 15	Getober 14
0-3 months 7-12		Columbus, OH	January 27	Doul	- mad
□ 4–6 months □ 13 m	onths +	October 20	_ saluary at	Bori	anu
		5886.3		Power ma	1





Borland Power made easy

Copyright © 1993 Borland International, Inc. All rights reserved. InterBase is a trademark of Borland International, Inc. BI 5830



magine working faster than you ever imagined.

DEC 3000-500X **HP 755** IBM 6000-

THREE NEW WORKSTATIONS THAT PUT IBM, HP AND SUN IN THEIR PLACE

Digital introduces three new members of its Alpha AXP" workstation family—the world's fastest family of workstations. The DEC" 3000 Model 300L AXP workstation, the world's fastest for under \$5,000. The Model 300, the world's fastest for under \$10,000. And the Model 500X—the world's fastest, period Alpha AXP workstations. Their breakthrough technology is so powerful they can fruly increase your productivity and provide solutions you never before thought possible And all are available now. To find out more about Alpha AXP workstations, our comprehensive trade-in and migration programs, or pre-sales technical assistance, call 1-800-DIGITAL, press "2," and ask for extension 77M: Or, for immediate information via Digital's Alpha AXP Fast FAX, call 1-800-842-7027 in the U.S. and Canada: Or contact your local Digital Representative



PUTTING IMAGINATION TO WORK

digital

MasterCard, Europay team up on network

NEWYORK

MasterCard International, Inc. and Europay International S.A. have joined forces to develop a single, Unix-based global transaction processing network for their 24 000-member financial firms

When the \$90 million project is com-

pleted by late 1995, the network is expected to operate up to 10 times faster and more reliably than the IBM Series/1 minicomputer-based networks the payment services providers currently use.

MasterCard executives said the project, which will replace 350 Series/1s with Intel Corp. I486-based Unix servers, will also eliminate European gateways

and Series/1 maintenance on both sides of the network. This is expected to reduce information technology overhead for both partners, including an estimated \$100 million in cost savings for MasterCard during the next seven years.

The network is expected to deliver all payment services products for both MasterCard and Europay, which together process more than 3.7 billion transactions per year for more than 10.8 million merchants. MasterCard is shelling out \$65 million for the project, while Europay is contributing \$25 million.

"A move to leading-edge technology, such as the one MasterCard is implementing, will have a positive effect on card issuers," said Lou Iannaccone, a vice president of systems at The Chase Manhattan Bank NA's Direct Response Division, a MasterCard member.

The network, called Programme Global, will be built by combining Master-Card's Project Omni with Europay's Columbus project, according to Philip P.

Verdi, executive vice president of electronic services at MasterCard. Both Project Omni. which started in 1990. and the Columproject were launched to provide proinnovations targeted for their respective pay-



MasterCard's Philip P. Verdi: Reformatting of data will no longer be necessary

ment services businesses, including equipment enhancements and state-ofthe-art fraud-detection systems

According to Verdi, there will be no changes made to MasterCard's global peer-to-peer packet-switching network, called BankNet, which includes fiber-optic connections through Bolt Beranek and Newman, Inc. switching nodes in 14 locations around the world.

More flexibility

"We're going to satellite processing in many parts of the world where terrestrial lines aren't very good, such as the Middle East, Africa and parts of South America. So if you lay that on top of applications we're redoing for authorization for settlement and clearing processes, the Unix environment gives us a lot more flexibility in moving things around [vs. the Series/1]," Verdi said.

For example, when MasterCard's European partners needed to transmit credit-card transactions to a cluster of IBM, Amdahl Corp. and Hitachi Data Systems Corp. mainframes at MasterCard's St. Louis data center via Series/1-to-Series/1 connections, the data would have had to be reformatted from European communications standards to conform with U.S. networking standards. Because Unix standards have virtually become universal, reformatting of data will no longer be necessary, Verdi said.

The X86-based Unix servers will likely be more cost-effective for MasterCard. For example, Verdi said MasterCard member firms that use 10 to 12 Series/1 front-end processors will be able to replace those with two Intel-based servers once installations begin early next year.

MasterCard and Europay are now evaluating numerous Unix vendors, though Verdi said his company is leaning toward a mix of IBM PS/2 and NCR Corp. System 3000 servers.



SPECIAL EVENTS

EDA/SQL Pavilion

Industry Spotlight

Super Server Showcase

OVER 500 EXHIBITS

Call (508)470-3870 for

Exhibitor Information

DATABASE WORLD

CLIENT/SERVER WORLD is

endorsed by the Client/Server Round Table, a non-profit industry

BONUS: ATTEND



CONFERENCE & EXPOSITION

DECEMBER 8-10, 1993 • CHICAGO, ILLINOIS

SIX FOCUSED CONFERENCES

- Databases and Tools
- Client/Server Applications
- Network Management
- Enterprise Database Connectivity
- Systems Integration
- Executive Client/Server-ALL NEW

Over 20,000 Attendees will Visit CLIENT/SERVER WORLD & DATABASE WORLD in 1993!

Call (508)470-3880 to register or to receive a complete brochure.

AIC5WC

Communicate At Breakthrough Speeds.



Get AT&T's SYSTIMAX® Structured Cabling Systems, And Get Speeds Beyond 100 Mbps.

Over copper. Or fiber. Your network can now have unprecedented speed and interoperability. All by installing AT&T's SYSTIMAX Structured Cabling Systems, with our HIGH-5™ product family of Category 5 components. They support today's network applications and emerging technologies like ATM, up to speeds of 155 Mbps. And this total solution offers you end-to-end connectivity, maximum network compatibility and the ability to evolve your network as your future needs

change. All from a single, reliable source. AT&T's HIGH-5 products come with a 15-year extended product warranty, and they exceed EIA-568 Category 5 specifications. The copper cabling was created by AT&T Bell Laboratories and has become the benchmark for Category 5 standardization testing. So find out how AT&T's SYSTIMAX Structured Cabling Systems can help you break through communications barriers. Call us at: 1 800 344-0223, ext. 3013. Outside the U.S.: 602 233-5855.

AT&T Network Systems And Bell Laboratories. Technologies For The Real World.



The future has to start somewhere.

We predict it will start in very close proximity to Motorola's PowerPC™ Microprocessors.

Here's why. Personal computers are on the verge of becoming infinitely more useful, more usable, more communicative and more mobile than they are today. A number of advanced technologies—real-time video, wireless networks, voice and handwriting recognition and object-oriented programming, among many others—are ripening, converging and becoming affordable all at once.

The one thing all those technologies need is extraordinary processing power. Processing power that only PowerPC Microprocessors can deliver.

In its various forms, the PowerPC microprocessor will provide the right combinations of high





performance, small size, low power consumption and low price that make it the only real choice for an incredible variety of applications. From massively parallel central servers, desktop computers and pocket-sized digital notepads to voice/data communications systems and automotive control units.

To take a closer look at the future of computing, call Motorola today at 1-800-845-MOTO. We'll be happy to provide you with more information, including our free PowerPC Information Pack.

The future of computing is going to be very different. That difference will be powered by PowerPC Microprocessors from Motorola.

PowerPC Microprocessors. Changing the course of computing. For the better.



Legent, HP to link host, Unix worlds

Legent Corp. and Hewlett-Packard Co. last week allied in an effort to produce an integrated suite of tools spanning mainframe and Unix client/server environments for performance and resource management.

Much like another alliance announced last week between Sun Microsystems, Inc. and Amdahl Corp. (see story below), the partnership seeks to address users' concerns about merging legacy systems with newer open or distributed platforms. IBM, meanwhile, is also addressing this issue but will go it alone.

HP and Legent said, and users agreed, that the integrated product suite will make it easier to manage large, diverse distributed computing environments. "Customers are demanding interoperable solutions, and they are demanding that systems management tools span the enterprise," said Phil Carrai, product marketingvice president at Legent.

The companies said they will take "best-ofbreed" products from Legent's mainframe tool box and HP's distributed systems management offerings and knit them into a spectrum of capabilities that will allow users to transparently dissimilar operating systems using just one workstation.

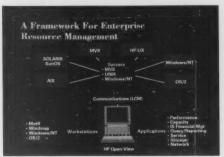
The plan extends a concept already embodied in Legent's Paramount, a product for downloading to a PC and displaying and analyzing the output of multiple mainframe performance monitors ICW. May 31]. It also moves Legent into the world of client/server.

Just what they want

That is just what Legent and HP customer Mead Data Central, Inc. in Dayton, Ohio, is looking for. Mead, which provides the Nexis and Lexis information services, is

moving its in-house applications from MVS mainframes to Unix-based client/server environments. Mead is likely to move its financial/administrative applications and Nexis and Lexis to a combination of HP. NCR Corp. and Sun Microsystems, Inc. Unix platforms, said Daniel Hursh, staff systems engineer,

Hursh said if Legent and HP had not made this move, Mead would have had to build its own



Strategy entails joining the best products from Legent's mainframe tools and HP's systems management offerings

bridges between the product lines. "This really brings together two of our key vendors for systems management," he said. "This is exactly what we were waiting for them to say."

Legent will begin selling HP's Unix-based performance and resource management products early next year. In the second half of the year, it will introduce integrated MVS/Unix applications under HP OpenView using Legent's Paramount architecture for performance, capacity and information systems financial management and reporting on Windows and the Open Software Foundation's Motif platforms.

The performance suite will include Legent's MVS, LAN, database and SNA performance products and HP's PerfView, as well as other Unix performance products such as HP Glance-Plus. The capacity and financial applications will combine the companies' MVS and Unix offerings, including Legent's MICS and HP's Performance Collection Software products.

The resulting applications will integrate into HP's OpenView network management system and move later to IBM's NetView/6000 and possibly to Sun's NetManager.

deliveries from Legent/HP alliance

December 1993: Interfaces will be demonstrated between Legent's capacity planning and accounting and HP's Performance Collection Software. First-quarter 1994: Legent will begin selling HP's Unixbased performance and resource management products. First half of 1994: Legent will introduce a MICS/Unix data integration application that will let users integrate HP Performance Collection Software Unix metrics data through Legent's MICS historical repository. Second half of 1994: Legent will unveil under the mainframe based Paramount umbrella MVS/Unix performance, capacity, accounting and reporting applications on OSF/Motif and Windows platforms. First half of 1995: The Paramount suite of tools will debut on Unix

Help on the way

Legent offered these scenarios for how its integrated products could help users:

· A Unix server takes data from DB2 on an MVS mainframe and passes it to client workstations. A performance problem in DB2 is detected by Legent's Insight for DB2 performance monitor, which sends an alert to Legent's Paramount. Paramount passes the information on to HP's PerfView performance

monitor which notifies users.

· A company wants to downsize an application from a mainframe to client/server and to look at questions of capacity, performance and user cost across the network. Without integrated management tools, each piece would be examined separately.

· An IS manager wants to look at enterprisewide systems performance across all oper ating systems. With the new Legent/HP offerings, the manager will be able to write one query to transparently access data distributed across the enterprise.

Sun, Amdahl team on open systems boxes

By Jean S. Bozman

Sun Microsystems, Inc. and Amdahl Corp. used Unix Expo last week to announce plans to jointly sell Sun's Unix servers and infuse Amdahl's commercial information systems expertise into Sun's Solaris operating system.

The two are teaming up to counter IBM's broad reach in Unix systems and legacy mainframe applications.

The alliance will also address the need to tie large data centers with proprietary mainframes into growing open systems networks, as will moves by IBM and the partnership between Legent Corp. and Hewlett-Packard Co. (see story above).

Sun expects to gain from Amdahl's expertise in managing heterogeneous systems, including IBM MVS systems and Unix mainframes, analysts said. Amdahl will continue to sell its UTS mainframes

How it breaks down

Sun and Amdahl: Both sell Sun SPARCserver 1000 and SPARCcenter 2000 Unix servers. IBM: Sells RS/6000s and PowerPC-based Unix

Sun and Amdahl: Work to enhance Sun's Solaris operating system with the reliability and performance features of UTS mainframe Unix variant. IBM: Uses standard AIX 3.2 operating system; plans to ship scalable AIX in 1994.

SERVICE

Sun and Amdahl: Will spell each other on service and support.

IBM: Provides its own support and service.

INTEGRATION OF LEGACY SYSTEMS

Amdahl: UTS runs on large IBM-compatible mainframes. Huron will support re-engineering of MVS mainframe applications for use on open systems; it already runs on Sun workstations. IBM: Tool kits for developers help downsize Cobol and Fortran applications on IBM hosts. New C++ tool kits help to build new open systems applications.

Real interoperability, rather than promises of such, is what users are looking for, according to one New York programmer who works at a mixedvendor shop that includes HP and Sun machines. "If there were true interoperability, you could flip machines in and out and not worry too much about the software. It's like cars: If someone comes out with more horsepower, you can buy that one.

Huron to the rescue

Another issue is the need for industrial-strength Unix applications. Sun users will be able to use Amdahl's Huron environment, now sold by Amdahl and its Antares venture with Electronic Data Systems Corp., to re-engineer legacy applications for use on Unix servers.

Amdahl Chief Executive Officer Joseph Zemke said Huron has already been ported to Sun's SPARC workstations. IBM, meanwhile, said last week it is providing new tool kits for C. C++. Fortran and Cobol so users can rewrite mainframe applications for RS/6000s.

Users who may have held off on open systems and re-engineering of open systems may like the Sun/Amdahl alli-

ance, analysts said. "I think that what Amdahl represents to Sun is a largescale commercial Unix platform," said Judith Hurwitz, a development tools consultant in Newton, Mas

"It's a venture that gives Sun a method to get out of the technical workstation 'box' the industry has made for them," said Donald Haback, executive vice president at D. H. Brown Associates, Inc. in Port Chester, N.Y. "By adding Amdahl's strengths to Solaris, you give the Solaris operating system more commercial viability."

Analysts speculated that Sun and Amdahl may have been motivated to cooperate because Amdahl plans to build future systems around Sun-designed SPARC RISC processors. Both firms use chips made by Fujitsu Ltd.

Sun and Fujitsu have also had a longstanding partnership. Earlier this year, Sun, Fujitsu and ICL agreed to standardize on compatible Unix versions.

The Sun/Amdahl alliance is openended, beginning with the cross-selling of Sun's SPARCserver 1000 and SPARCcenter 2000 and the development of Solaris software with enhanced reliability and performance.

Send It To Me.

Name _____

Title

Company _____

Address _____

City ____

tate _____Zip

Phone.



CW9/2





Hardware vendors that have used INFORMIX°-OnLine to publish TPC benchmarks include:

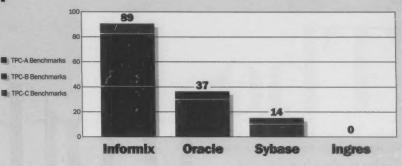
- · MIPS

• Motorola • NCR

· Olivetti

- · Control Data
- Corporation · Data General
- · Digital Equipment · Sequent
- Corporation • Fujitsu
- · Hewlett-Packard · Texas Instruments
- Siemens Nixdorf
 - Sun Microsystems · Unisvs

*UNIX TPC-audited benchmarks published by hardware manufacturers as of 9/1/93.



Source: Transaction Processing Performance Council (TPC), 1993

For the Best Database Performance, **Hardware Vendors** Choose Informix.

INFORMIX-OnLin	e Features Include:
✓ ANSI-standard SQL	✓ Optical disk support
✓ BLOB support	✓ Referential integrity
Disk mirroring	✓ Rollback
Distributed database	✓ Row-level locking
DRDA-standard DB2 gateway	✓ Runtime integrity verification
Incremental archiving	✓ Secure auditing
✓ Integrated DBA environment	✓ Stored procedures
✓ ODBC support	✓ TP monitor compatibility
On-line archiving	✓ Triggers
On-line recovery	✓ Two-phase commit

When they want to show high performance, hardware vendors choose the database that delivers. Time after time, the choice is Informix. Whether it's TPC-A, TPC-B, or TPC-C, INFORMIX-OnLine provides the kind of benchmark numbers hardware vendors use to prove that their systems provide a competitive advantage.

High Performance in Demanding Environments.

OnLine is engineered for high performance in heavy transaction processing environments—a fact that's evident in new TPC-C benchmark results. Unlike TPC-A and TPC-B, TPC-C was specially designed to include transaction types that more accurately mirror real-world transaction processing. In other words, TPC-C results are a realistic look at how an RDBMS will perform in your own business. And hardware vendors are using INFORMIX-OnLine to publish TPC-C results.

Informix has been providing information management software for open systems for more than a decade -including UNIX, Net Ware, and Windows NT. With fully scalable, high performance database servers, application development tools, and a range of connectivity solutions, Informix is the choice for dynamic companies.

Free Aberdeen Group Report.

Find out more about TPC benchmarking and Informix in the new Aberdeen Group Report, "Commercial Benchmarks 1993: As Easy as TPC-A,-B,-C." Call us at 1.800.688.IFMX, ext. 11 or send in the reply card and we'll send it

to you-free of charge.



The

Before you decide what client/server platform is right for you, make sure you know what's true, and what's Not True.

Fact: the OS/2° client/server solution preserves your current hardware and software investment,

accessing your mainframes, minis and PCs when necessary and bringing their power and capacity to the desktop level. Fact: the Windows NT™ solution is

based on PC servers and desktops and doesn't embrace all your existing resources. That could mean porting applications and data. The only plus that offers is the cost of porting plus the cost of additional PC servers.

Fact: OS/2 2.1 runs DOS,
Windows™ and more than 1,200 native
OS/2 applications. With LAN Server 3.0
or Novell® NetWare,® OS/2 supports DOS,
Windows, OS/2 and Mac clients. Fact: it³s
not likely NT will support all your existing
applications. It won't run_existing 32-bit
applications like WordPerfect® 5.2 for OS/2
and Lotus® 1-2-3® for OS/2. It will require
additional software to support DOS, OS/2 and
even Windows clients. Worse yet, Infoworld sources

The OS/2 client/server solution exploits your existing hardware and software investment. There's No Telling how much the NT solution could cost you.



about



▲ All this monkeying around with NT raises lots of questions. OS/2 has the answers.

report that Windows 3.x applications run 20% slower under NT than they do under OS/2 2.1!

Fact: OS/2 delivers powerful, reliable, client/ server applications for data storage and retrieval (DB2/2,™ Oracle 7,* InfoPump™), communications (Communications Manager/2, REMOTE OS,™ TalkThru°), transaction processing (CICS, IMS Client Server/2 V2), comprehensive network management (LAN NetView,* CA-UNICENTER,*



Domain/DACS,™ AlertView,™ Foundation Manager™), and more. Fact: The NT strategy is still Not There, and neither are native client/server applications.

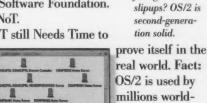
Fact: OS/2 is committed to the industry-accepted Distributed Computing Environment (DCE) standards of the Open Software Foundation. Fact: NT is NoT.

Fact: NT still Needs Time to

C) aves 0

C) resear

0



■ With OS/2, it's full speed ahead for your DOS, Windows and OS/2 applicationsthere's no need to buy DOS and Windows.

▲Who needs

first-generation

wide. It's the leading, second generation, 32-bit Intel®-based operating system-a more stable, more developed version of the awardwinning March, 1992 release.

If you're looking for a cost-effective, secure, high function client/server solution today-Not Tomorrowthen OS/2 is for you. To order or to find out more about OS/2 2.1, call 1 800 3-IBM-OS2. In Canada, call 1 800 465-7999. OS/2 2.1 is also available at your local software dealer. And that's a fact.

Operate at a higher level.™



This ad was created by LINTAS and got to this publication on time using DOS, Windows and OS/2 programs running on OS/2. IBM, OS/2 and Net/few are registered trademarks and D62/2 and "Operate at a higher level" are trademarks of International Business Machines Corporation All other products are trademarks or registered trademarks of their respective companies. © 1993 IBM Corp.

Digital outsources IS control to itself

Digital Consulting's

Gresham Brebach Jr.:

Unit wants to gain

outsourcer

fast credibility as an

Cutting the fat

Gresham Brebach Jr.,

Digital Consulting, said

processing" and needs

who is now in charge of

information systems,

declined to comment

on how much money

he hopes to save in the

consolidation process.

He noted that Digital's

internal IS head count - including the

outsourcing - will be

undetermined amount

as Digital Consulting

takes "the fat out of

the current system."

centers will take

"several years" to

complete, he added.

The shedding of data

number of workers

devoted to

reduced by an

to reduce the number

of its data centers to

cut costs. Brebach.

the company's

vice president of

Digital has "overly

decentralized data

By Craig Stedman MAYNARD MASS

Digital Equipment Corp.'s professional services organization is now running the company's data processing operations as a prelude to trying to increase Digital's relatively small presence in the outsourcing market.

Digital plans to focus mainly on network outsourcing, an area in which analysts said the company has a good reputation. However, they added that it has not yet shed its image as a product vendor first and foremost. Meanwhile, some existing Digital outsourcing customers were critical of the company's bureaucracy

Data center reduction

Internally, the number of Digital's data centers will be reduced sharply following the shift of data processing responsibility from the finance department to Digital Consulting, said Gresham Brebach Jr., vice president of that business

Help wanted

Digital has taken its search for a chief information officer inside the company after failing to entice prospects from outside, following its transfer of data processing responsibilities to the Digital Consulting unit.

"It's not that there aren't good people out there," said Gresham Brebach Jr., vice president of Digital Consulting, "It's just that some people want to control the whole nine vards, and they're not going to be able to do that here because we're running the data centers.'

The CIO's main role at Digital will be to manage the development of the company's applications, Brebach said. Some outsiders viewed that as "a step down" from their current duties, he added.

Another sticking point: The CIO will report to William Steul, Digital's chief financial officer, because financial applications are "obviously an integral part" of the position, Brebach said. He acknowledged that a CIO would typically report to a company's president or chief executive officer, "but in this situation, because of the nature of the job, [working for the CFO] is the way it should be."

Digital recently offered the job to an employee in Europe, Brebach said, but he declined to identify the individual. The firm previously had separate CIOs responsible for Europe, Asia and the U.S., but now wants the new CIO to centralize global application development.

-Craig Stedman

unit. He said he expects to cut the roster of about 200 data centers by two-thirds or more.

However, Brebach said the main reason control of the information systems group changed hands was to buy the consulting unit some fast credibility as an outsourcer while also giving it direct control of the IS facilities and workers it uses on outsourcing contracts.

Previously, analysts noted, Digital Consulting had to negotiate individual subcontractor deals with Digital's local IS managers to get space for outsourcing work. It was a time-consuming process, and the cost of facilities, power and personnel varied.

Brebach acknowledged that previous outsourcing contracts had been handled largely on a local basis. "We want to manage that more centrally now," he said.

Paul Johnston, an analyst at International Data Corp. Framingham. Mass., said Digital Consulting is "behind the curve in running [data processing]," compared with other outsourcing vendors, and was held back as a result. "They need to be able to show that they have the infrastructure in place to manage these contracts," Johnston said.

The lack of data processing control also created a perception problem with potential outsourcing customers, Brebach noted. "The first question you get is, 'Do you run your own data processing?' And if the answer is no, you don't get very far."

Following leaders

remain small compared with market leaders such as

tems Corp., IBM and Computer Sciences Corp. (see chart).

"They are a factor in their installed base, but when you look at competitive situations, Digital is not up there competing with the Big 3," said Julie Schwartz, a Dataquest, Inc. analyst based in Framingham, Mass.

"Most companies we're in that business," conceded Brebach, who joined Digital last April after

leaving McKinsey & Co.

However, Brebach said he wants Digital Consulting to be-

come more of a factor in outsourcing by mid-1994, still focusing on network outsourcing rather than the traditional glass house data centers

Rita Terdiman, an analyst at Gartner Group, Inc., a consulting firm based in Stamford. Conn.. said Digital earns good marks as a network services provider, despite not having pushed outsourcing "as much

as they could have." Terdiman and other analysts noted, however, that Digital has yet to shed its product vendor image. "Their biggest hurdle is that users still view them as a technology company, not a services company," said Mike Melenovsky, an analyst at IDC.

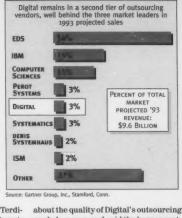
Digital is "good at making hardware and running a data center, and it has lived up to that," said Rod Sikes, vice president of information technology at AMC Entertainment, Inc., a movie theater chain based in Kansas City, Mo., that outsourced its VAX data center and network to Digital last October.

Bureaucracy blues

However, Sikes said he does "get frustrated with their bureaucracy." Digital responds slowly when AMC tries to buy PCs and other products for the operations it still runs internally, and it has not been made clear whether he should deal with the outsourcing unit or with Digital's local sales office

for such purchases. "I just try to play both ends and see if I get an answer."

Santo Crisafulli, director of global operations at Foreign Exchange Transaction Systems, Inc., a Citicorp subsidiary in Long Island City, N.Y., has had an outsourcing contract with Digital since 1989. He agreed things "don't always run smoothly they 88



work, however, and said the bureaucratic problems have not been beyond expectations. "I'd like to say everything has been perfect, but that would be a lie," he said. "But the bumps haven't been too big, and we've been able in short order to manage through them.'

Same idea. different company

Digital's hand off of data processing responsibilities to its professional services organization mirrors a similar move last year by IBM, which has been shifting control of data center operations to its Integrated Systems Solutions Corp. (ISSC) outsourcing subsid-

Data centers that support IBM's marketing and sales and manufacturing and distribution operations are all being put under the control of ISSC [CW, March 15].

IBM has also been consolidating its data centers in conjunction with the internal outsourcing

Controlling internal data processing has virtually become a requirement for outsourcers, said J. P. Richard, an analyst at Input, a Vienna, Va., market research firm. "Most of the substantial vendors run their parents' shops," including market leader EDS with General Motors Corp., according to

A holdout is Unisys Corp., which, like Digital, is trying to improve its place in the outsourcing pecking order. Unisys' own MIS department remains separate from its outsourcing operation, a company spokesman said.

-Craig Stedman

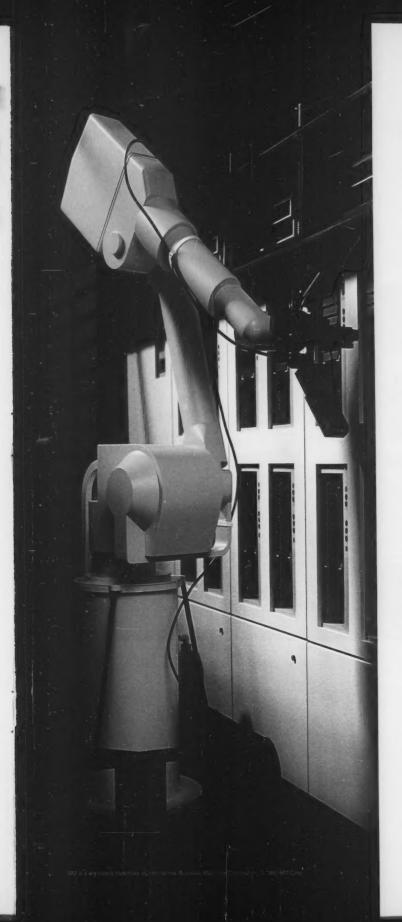
Digital's outsourcing sales

Electronic Data Sys-

don't even know

A small slice \$200 MILLION \$3 BILLION PROJECTED FISCAL 1994

> should" because of bureaucracy. Crisafulli said he had no complaints



Forty-five
trillion bytes of data,
the hands
of a surgeon, and
the best brains
in the business.
It's not just
a tape librarian.

It's poetry in motion.

You've never seen data handled this elegantly. Or this efficiently. Meet the IBM 3495 Tape Library Dataserver: a complete, automated tape solution that reduces the cost of storing and retrieving large volumes of data while it maximizes speed, flexibility and expandability.

The 3495's brain is an ingenious tape library manager that, when coupled with our unique Data Facility Storage Management Subsystem, acts as a "traffic cop" to control data and get it where it's needed, short and long-term. You also get the most from your media, thanks to industry-leading tape drives that use "smart" compaction to boost capacity and performance.

The physical chores are handled by an engineering marvel that took first place in *BusinessWeek*'s IDEA93 National Design Competition. This expandable, automated tape library can support up to 64 tape transports or house as many as 18,900 cartridges. And the 3495's open systems connectivity means many diverse clients can share the same library.

To get the facts about this superhuman librarian, call 1 800 IBM-6676, ext. 675 today.



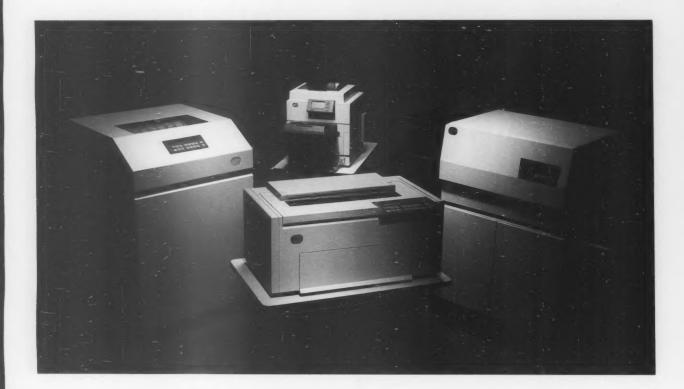
IBM

A little hard work never hurt anyone. A lot of hard work however is an entirely different story. Especially if we're talking about system printers. If they go down, the flow of information within your company can come to a grinding halt. Which means your business may come to a grinding halt.

You don't want that. Neither do we. We're Pennant Systems, an IBM Company 100% dedicated

to printing. Pennant™ offers printers, printing software, maintenance and other services that are designed to keep your company's data flowing. Seven days a week, 24 hours a day if you need to. Regardless of the application or the hardware you're using. We also support a broad range of printer data streams including IPDS, PostScript, PCL and others, without having to rewrite your application code.

Our printers are engineered to handle most of what your business needs to



print. Whether it's bar codes, invoices, simple text or complex reports, no other company offers you as many options in quality printers as Pennant.

Take for example our newest additions to an already big family of products. The 4232 matrix printer uses either cutsheet or continuous form paper. The 6408 line printer is perfect for office environments because at 52 dBA it's as quiet as most laser printers. Our 30-page-perminute 3930 Page Printer can handle a wide range of attachments, while

our 3916 Page Printer, with optional duplex printing, is perfectly priced for entry-level buyers.

And those are just our newest offerings. Chances are if you have a need for a non-impact, line or serial printer, Pennant can help.

If you'd like more information on these or any of our other printers, please call 1-800-PENNANT anytime. Because working around the clock applies to more than just our printers.

ADVOCATES OF THE 168-HOUR WORK WEEK.

Redefining Printing.™

PENNANT

An IBM Company

Tech

Talk

Call home

meritech Corp. earlier this month said it would test a voice-activated dialing service that would let consumers operate a telephone without pressing a single button. The Chicago phone company will use a patented voice-dialing system from Texas Instruments. Inc.'s Telecom Systems Unit in Austin. Texas, and fault-tolerant Unix servers from Tandem Computers. Inc. in Cupertino, Calif. Ameritech's future voice-dialing option. which could be commercially available as early as next year, will provide a personal voice directory for each household member, with a total of 70 voice-activated names per household.

Mass storage

ast month, IBM Adstar scientists reported they had discovered a way to store up to 10 billion bits of information per square inch of computer disk surface, or a density 30 times greater than current disks. The feat is accomplished by a variation on the so-called "magnetoresistance" effect, whereby the materials in the disk drive's read head change their electrical resistance in the presence of a magnetic field. Adstar scientists were able to produce a "giant magnetoresistance" effect, resulting in a signal five times stronger than current methods. Because of the stronger signal, disk drive heads produced with materials exhibiting the effect should be able to detect magnetic spots that are much smaller and more densely packed than those in current systems, according to IBM. The prototype head has yet to be developed.

T-byte Rex

-Systems in Dallas announced a commercial patent—its first—for its massive data storage technology, which stores from 5T to 10,000T bytes. E-Systems' commercial products unit, Emass, is already selling massive data storage systems based on the technology.

Looking (back) forward

By Ellis Booker

echnology breakthroughs
rarely change the world overnight. Sometimes a heralded
advance never achieves its
promise; it can be derailed by
unseen difficulties or superseded by other approaches.
In any event, a look back to

In any event, a look back to update the fortunes of some "advanced technologies" is a useful exercise. The following are updates on stories that appeared on this page during the past three years:

September 1993: Optical

A "proof-of-concept" fully optical computer, developed and shown by the University of Colorado six months ago, has given researchers there plenty to work on.

"We've reached a plateau level on the experiment and are going back to the theoretical work to understand and extend the techniques," said Harry Jordan, a professor of electrical and computer engineering and one of the development leaders at the university's Optoelectronic Computing Systems Center (OCSC).

The OCSC demonstration was the first of its kind to use light pulses to both calculate and store data elements conveyed along three miles of spooled glass fiber. Each "bit" is carried as a 12-foot light pulse. An earlier system shown by AT&T Bell Laboratories had used an external electronic computer for program control.

Still ahead for the experiment is a multiplex trail, whereby two virtual machines run simultaneously on the same hardware. "Every other pulse will belong to one of the two virtual machines," Jordan explained. Other related projects at OCSC include the development of a high-speed graphics processor that uses light waves in "free space" and the creation of an optical switch to interconnect high-speed computers.

The fully optical computer has been a dream of computer scientists for decades. Theoretically, doing away with physical media (wires and silicon chips) would dramatically increase a computer's speed.

A light-based computer that dispensed with optical fiber to carry the light beams could feature a virtually limitless number of interconnections in free space — the ultimate architecture for a massively parallel system.



September 1992: Speech recognition/translation

After the successful January demonstration of Janus, an English/German/Japanese recognition/translation system, researchers at Carnegie Mellon University's Center for Machine Translation are now at work on a more general-purpose, two-person translation system.

Unlike the 400-word Janus, developed to register attendees at an international conference, the two-person system will use an unconstrained vocabulary and allow users to speak more naturally, according to Arthur McNair, a research programmer in neural network speech at Carnegie Mellon.

"Our biggest change is working on spontaneous speech, allowing people to say things like 'ummm' and 'ah' and restart their sentences," McNair said.

The "task" of the new system will be to schedule an appointment, translating sentences such as, "Can we meet next Tuesday at 10 a.m.?" and "No, I have a meeting then" into English, German and Japanese. Eventually, Spanish will be added to the mix.

A public demonstration of the system is a year or two away.

September 1991: Eye-tracking

Despite high hopes two years ago, eye-tracking systems have yet to crack the commercial marketplace to become "the ultimate" computer interface.

The gear is still important to military and research users, however.

And affordable, PC-based systems that have come on the market in the past two years are proving a godsend for some disabled persons [CW, Aug. 30].

"There aren't any big markets yet," acknowledged Rikki Razadan, president of Isean, Inc. in Cambridge, Mass., a vendor that was profiled two years ago. Nevertheless, Razadan said, "There's no question that this technology will show up on user desktops." Immediate future uses include videogame applications.

A year-and-a-half ago, Iscan introduced its Eye-Slaved Pointer system, a tabletop eye-track setup for the disabled. The \$15,000, PCbased system comes with software that enables its user to dial a telephone, do word processing and access message boards.

The technology in the PC-based system is based on Iscan's \$50,000 to \$60,000 military and research products.

September 1990: Project Athena

Back in September 1990, Athena was still an experiment at MIT. By the next July, however, the Unixbased, campuswide computing environment, had been officially merged into the university's information systems group.

Today, Athena is the primary academic electronic resource at MIT and supports some 14,000 students and faculty members. Other changes since 1990 include ports to vendor-specific Unix operating systems, such as Digital Equipment Corp.'s Ultrix and IBM's AIX, and a trend toward using third-party software packages.

It's the new PC DOS 6.1 from IBM. And it one-ups
MS-DOS® 6 for a lot of reasons.
For one, it's got improved memory man-

Introducing PC DOS 6.1



For one, it's got improved memory management. The Memory Optimizer not only gives users more memory, but also a configuration watcher to run the system more efficiently.

It's got utilities you don't get with MS-DOS. For instance, you get a Program Scheduler

MS-DOS 6.0

for any program or DOS command, and a new editor that allows you to edit files at the same time.

It's got features you don't get with MS-DOS. Such as support for PCMCIA Card Services (i.e., hot plugability for portable users),

one

and the industry's leading Pen support for DOS.

And there's one more reason that goes beyond the software—PC DOS 6.1

is backed by superior service and support, including a 24-hour helpline you can actually reach. What's more, the first 60 days of support are free.

So if you haven't got PC DOS 6.1, get it from your local software dealer. Or call 1 800 342-6672.

Features and Functions	PC DOS 6.1	MS-DOS 6
Backup—Tape support;	×	
High-speed floppy disk support	×	
Approximate number of viruses that can be detected	>1,400	800
Automated system configuration optimizer	×	
PCMCIA II support	Х	
Enhanced editor	X	
Program scheduler	×	



(In Canada, call 1800 465-7999.)

When you consider all it's got, PC DOS 6.1 from IBM is definitely the one to get.

better.

INTERNATIONAL DATA CORPORATION INSIGHT

New Cost-to-Use Analysis Key to E

Sponsored by IBM Appli

DC has developed a better method of evaluating costs of computing. Price/performance numbers based on hardware benchmarks are often extremely poor predictors of the actual computing costs users will face. This especially true in situations where customers are distributing very-com-

plex workloads across an enterprise.

Hardware priceperformance benchmarks such as TPC-A provide solid, base-level comparisons in specialized environments. They don't reflect the complexity of most users' business needs and

processing workloads. Therefore, they have limited value in making realistic buying decisions.

To help IS management better predict the true cost of computing, International Data Corporation (IDC) developed a "cost-to-use" model. This model is intended to more-accurately measure and compare the full costs of using four types of leading midrange systems in networked, enterprise-wide applications. The systems in the study were: IBM AS/400, DEC VAX VMS, HP UX, and Net-Ware LANs.

Contradicts Price-Performance Notions IDC studied more than 150 commercial computer installations in the United States. We interviewed more than 30 customers who have installed networked-enterprise systems to assess the full range of computing costs in complex, enterprise-wide environments. The model IDC developed from this research includes hardware, system software, applica-

tion software, development-staff and operations-staff costs, and all overhead costs associated with remote-systems management performed by a central

site over a five-year period.

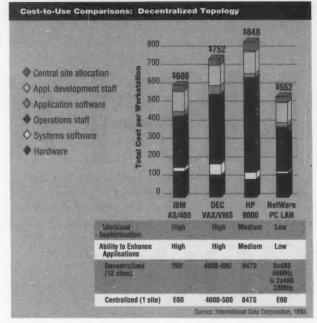
IDC believes the results of this study

provide IS professionals with the best information available on the costs of processing in the most-complex type of computing environment, the networked enterprise. While we doubt that the results of the study will come as a major surprise to those who have fully considered the issues, our data contradicts notions based simply on hardware price/performance figures.

Ontions

Four major options appear to be available to PC LAN users.

 Do nothing, and continue to live with existing distributed or decentralized topologies and functional-



ity as they currently exist.

2. Wait for LAN vendors to deliver

Wait for LAN vendors to delive the needed functionality.

3. Add to operations staff, even though this will increase costs out of proportion to the increase in benefits

4. Implement currently available technologies that provide the advanced functionality not yet available on LANs. While this may result in higher up-front costs, the IDC Cost-to-Use model indicates that this is the most-effective choice.

Staffing costs dominate

For example, consider the following:

Integrated systems-management software services (a series of coordinated tools for administering local and remote systems) are a major differentiator for users because staffing expenditures dominate overall cost in the networked enterprise.

In a distributed topology, operations-systems staffs for IBM AS/400 and DEC VAX systems cost \$36 per workstation per month, roughly a tenth of the cost of a LAN-based system. In a decentralized topology, as opposed to distributed, the reverse is true — LANs had the lowest costs for operations staff at \$244 per workstation per month. However, IDC believes these staffing costs are likely to rise during the next two years as the LAN-based applications mature and require reworking.

 Users — even IT professionals generally lack experience with networked enterprise topologies. The logistics of distributing new software, software updates, physical and electronic support services, and hardware in a networked enterprise are viewed as a major barrier to success. As a result, few users are taking full advantage of the possible benefits of complex, distributed processing.

 The application set on LANs tends to be less-sophisticated than those on minicomputers. Development resources available for minicom-

Cost Components: Typical TPC-A Model vs IDC's "Cost-to-Use" Mode	Model vs IDC's "Cost-to-Use" Model
--	------------------------------------

The IBM AS/400,

sometimes mistaken

as a premium-priced

product, emerges as the

lowest cost-to-use system

in complex, networked,

enterprise-wide process-

ing environments

Component	TPC-A	IDC Cost-to-Use
Hardware :	CPU, memory, disk/tape, ter- minals, 5-year maintenance	CPU, Memory, disk/tape, terminals/worksta- tions*, maintenance, depreciation
System software	Operating system, runtime database, transaction process- ing monitor, minimal network- ing, 5-year software maintenance	Operating system, development database, system management tools, transaction processing monitor, compiler, robust LAM for mixed clients (terminals and PCs), SNA-based WAN connections, 5-year software support
Operations staff	None	Manager, operators, technical support, specialists (PC, communications and security), help desk, administrators (DBMS and LAN), outside services
Applications software	None	Accounting, office automation, PC services, and support
Applications development staff	None	Manager, programmers (database, systems, and applications)

^{*} Minicomputer-based topology included 60% PCs, 40% terminals. NetWare LAN-based topology included 100% PCs. Source: International Data Corporation, 1993.

valuating Networked Enterprises

cation Business Systems

puters often are considerably more sophisticated that those available for LANs. In response to rapid changes in business environments, we believe that many LAN-based applications in networked enterprises will require significant reworking in the 1993-1995 time frame as the environments move from support roles (i.e. file, print, and electronic mail servers) to full-fledged production applications (OLTP, database, accounting, and data analysis) computers.

 The IBM AS/400, sometimes mistaken as a premium-priced product, emerges as the lowest cost-to-use system in complex, networked, enterprise-wide processing environments.

The IT industry is currently investing heavily in distributed computing — and rightly so. Distributing processing power while retaining overall cohesiveness is an outstanding strategy for achieving the most-pressing objectives facing IT professionals today: organizational effectiveness, better return on IT investments, increased productivity, and morerapid exploitation of new technologies.

However, distributed processing is associated with significant complexity and uncertainty. Making the right decision requires higher quality, more-relevant information.

Conclusions

The information technology market is a very-complex place to shop. An expanding variety of hardware, soft-ware, and communications technologies, most associated with individual functional capabilities — that offer unique benefits — is being marketed by IT vendors to prospective and current customers. IT professionals demand better sources, quality and types of information to help them make the right decisions when planning purchases in this market.

Popular benchmark metrics such as TPC-A are specialized indicators of application performance (e.g. OLTP). As systems topologies get more complex, the appropriateness of this benchmark decreases dramatically. But TPC-C and the forthcoming TPC-D and TPC-E benchmarks will provide significant advances.

Users are exploring more-complex topologies as they attempt to support more-complex business strategies.

Тура	Number of networked sites (+1 central site)*	End-user devices per site*	Primary objective	Best fit	Example
Distributed	115	16	Reduce opera- tional costs by centralizing support and minimizing local IT resources	Multiple units, similar compet- itive conditions	Branch offices or franchises
Decentralized	12	150	Maximize operating unit flexibility, minimize infrastructure costs	Multiple units, dissimilar com- petitive condi- tions	Consumer goods or manufacturing

* Site size and end-user populations based on survey data. These qualities are used as the basis for all distributed and ecentralized analysis Source: International Data Corporation, 1993.

The distributed enterprise and the decentralized enterprise, although more complex relative to traditional host-based, fully centralized configurations, are especially attractive to many companies. Comprehending options in these more complex setting, however, requires special costing tools.

IDC applied its Cost-to-Use model to help users better understand tradeoffs between alternatives. From our research, the following conclusions emerged:

 Overall costs-to-use in networked enterprise are very dependent on staffing levels. Superior systemssoftware services allows users to minimize staffing levels at remote sites without also minimizing IT support and responsiveness.

*IBM's AS/400 and Digital's VAX VMS systems, largely because of their advanced system-software capabilities, are more attractive alternatives to LANs in sophisticated, networked OLTP enterprises. Moreover, our research indicates that IBM's AS/400's cost to use is superior even to Digital's VAX VMS offerings.

 The Hewlett Packard 9000 offers excellent pricing at the hardware level. It is being positioned to attack costs of complex topologies and staffing issues. Its vulnerabilities are in applications software and system software in distributed topologies. In decentralized topologies, HP displays a lack of sophistication in system- and networkmanagement tools relative to IBM and DEC.

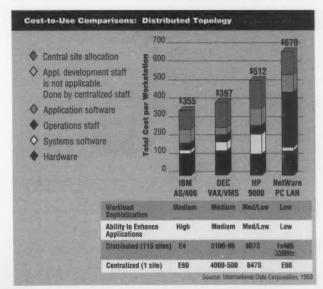
 As customers gain more experience with complex, networked enterprise topologies, they will (1) become more familiar with the logistics and politics of choosing, implementing and managing complex topologies, and (2) they will deploy these complex topologies

Although we feel that the functionality of UNIX and LAN alternatives will increase over time, customers looking to take advantage of the benefits of networked enterprise topologies should strongly consider more integrated alternatives.

 Many users with LAN-based, decentralized enterprise topologies will be forced to chose between continued reliance on aging, lesssophisticated applications — and the potential competitive disadvantages implied by that choice — or greater staffing costs to rework and maintain their code base. We feel that they will have to choose more staff, despite the added costs, if they retain these topologies.

sydou's cost and maintain their code base. We feel that they will have to choose more staff, despite the added costs, if they retain these topologies. So vulnerabilions software to distributed software maintain their code base. We feel that they will have to choose more staff, despite the added costs, if they retain these topologies.

For a copy of the complete report, "Cost-to-Use of Midrange and PC LAN Systems in the Networked Enterprise," call n distributed 1800-765-0119.



Valley of dearth

At a gathering of SAS Institute users at the company's Cary, N.C., campus last week, the talk was all about client/server. At one point, a SAS

saleswoman pointedly asked me, "What is it about the press and client/server? Our customers get all whipped up over this stuff from reading trade journals, and then we have to go in there and tell them how difficult moving to client/server really is.

To quote Saturday Night Live's Mr. Bill: "Oh, noooooo!" I certainly hope we're not guilty of contributing to any happy talk over this most difficult of technology challenge

But the woman has a point. Users are being sold a bill of goods on client/server, not just by members of the press but by a clutch of consultants, newsletter publishers, market researchers and vendors — lotsof vendors — whose shortsighted view of client/server's complexity stops roughly at the user's credenza.

Too much attention has been focused on short-term hardware savings and not enough on the cost of people and lack of features. Yes, client/server does let you replace expensive, proprietary computers with cheap, mass-produced ones But that's about all that's cheap about it. Users on the western front of the client/server wars report the headaches



and support costs imposed by unreliable networks, toy operating systems and nonexistent system management tools more than offset the cheaper chips.

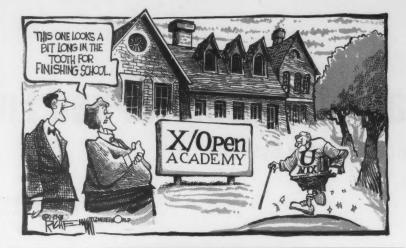
The tough nut about client/server development isn't the client; it's the server. While lots of impressive client/server management and utility products currently exist in press release form, I have yet to meet a user who'll say that these technologies can hold a candle to what's been available on a VAX or a 370 for years. How can they? A distributed network with six potential points of failure is a lot tougher to manage than a host/terminal network with two. As Xerox PARC alumnus Butler Lampson once said, "A distributed system is one in which I can't get my work done because a computer has failed that I've never even heard of." Complexity is the nature of the beast, and we'll just have to live with that.

Ditto for database management, security, backup and recovery, program development and more. Those are boring issues relative to the merits of Visual Basic or SQL Windows, but they're the issues stubbing the toes of IS organizations around the country right now.

That said, why should IS organizations continue to charge ahead into this valley of dearth? Because client/server makes so much sense for business reasons. Flexibility is what client/server is all about. While the short-term costs of a client/server project will almost certainly be higher than a mainframe approach, the long-term savings from greatly reduced training, support and infrastructure upgrade costs will more than make up the difference.

Sorry if we or any of our brethren have made this stuff sound easy. It isn't. But it is the future. Of that there can be no doubt

Paul Gillin, Editor



Notes price is fair, but rework model

Recently I was quoted advocating that Lotus release a much cheaper runtime version of Notes to increase market penetration [CW, Aug. 16]. I want to point out that I think that Notes is worth every penny Lotus charges, and that, given the vast resources Lotus has spent developing it, the price it charges is more than fair.

However, Notes, like the telephone. E-mail or fax machine, increases in value proportionately to the number of users, and I fear it will lose a chance to become the de facto standard by using an economic model that works better for refrigerators than for software. I still believe it would be better for companies to have pricing that encourages them to install Notes on every desktop as soon as possible.

Carolyn Coughlin Weissberg Genencor International San Francisco

Frustrating curve

It's understandable why Tim Lynch states that object-oriented technology is easy to grasp in "Object orientation isn't salvation" [CW, Sept. 6]: He hasn't grasped it. Open your eyes to the millions of lines of C code being written in C++, to the unused copies of SmallTalk, to the data flow diagrams being drawn with OOA notation, and you'll see a steep learning curve and many frustrated developers. Object technology is more complex and is different. and to pooh-pooh the learning

curve is to negate the honest efforts of thousands of professionals exploring and applying this new technology.

Reading a book, taking a class and playing around with a visual development tool doesn't qualify you to estimate the effort required to grasp object technology. Please, until you've climbed the mountain, don't tell others how short and flat

> G.K.Khalsa San Diego

Got it; get it?

Your article on the Newton Toolkit [CW, Aug. 23] omitted a key fact that probably led readers to an erroneous conclusion.

The article states that the Newton Toolkit is "scheduled for imminent release." While this is correct relative to the production version, Apple has been distributing the Newton Toolkit beta version since the first week of August. I acquired one on Aug. 5.

T.R. Unkefer LTV Steel Co. Cleveland

Try out a new spin

In "Where's CASE when we need it?" [CW, Aug. 23], John Gantz points out a major weakness of most visual development tools: maintenance. I find little to argue with about this. The problem is that each element must interact. creating an invisible cascade effect whenever a major design change is required.

I disagree with Gantz's final conclusion that applications developed with these tools will "crash and burn" two years later. He might have just been making a philosophical point, but it seems more likely he missed the paradigm bus. By applying a different spin to the application life cycle we can turn a maintenance weakness into another advantage!

When a prototype is the application, there is never any need for major refinement or maintenance.

But what are we doing instead of maintenance? Why, all the stuff we gave lip service to but never had time for: developing an enterprise data model, documentation, user support, training, business needs analysis, strategic planning, evaluating products, developing marginal needs systems, building test suites...

I have seen the future and it was a visual experience.

Jack William Bell Computer analyst/ programmer Lacey, Wash.



■ COMPUTERWORLD WELCOMES COMMENTS FROM ITS READERS. LETTERS MAY BE EDITED FOR BREVITY AND CLARITY AND SHOULD BE ADDRESSED TO BILL LABERIS, EDITOR IN CHIEF, COMPUTERWORLD, P.O. Box 9171, 375 COCHITUATE ROAD, FRAMINGHAM, MASS, 01701. FAX NUMBER: (508) 875-8931: MCI MAIL: COMPUTERWORLD. PLEASE INCLUDE A PHONE NUMBER FOR VER-

More Application Development! 51 Issues for \$48 Now Only \$42.95 COMPUTERWORLD

Yes, I want more. I accept your offer of \$42.95* for 51 weekly issues. That's a savings of over \$5.00 off the basic subscription rate.			UNIX efficient entries of the called confidence of the called confidenc
First Name	MI	Last Name	### CONTROL OF THE PROPERTY OF
Title	Company		
Address			Net Ware 4.0 to roll
City Address Shown:	State	Zip Renew Basic Rate: \$48 per year	A 8 10 10 10 10 10 10 10 10 10 10 10 10 10

 U.S. Only. Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

- 2. TTILEFUNCTION (Circle sen)
 IRANSOUP MANAGEMENT
 IRANSOUP MANAGEMENT
 IS CHIEF CHIEF CONTROL President/Aust. VP
 ISANSOP Management
 I Dir // Mgr. MS Services, Information Center
 I Dir // Mgr. Services, Information Center
 I Dir // Mgr. Services, Information Center
 I Dir // Mgr. Services, Information Services, Information
 I Services, Information Center, Information
 I Services, Information
 I

- Are you involved in the purchase or use of the following: (Circle all that apply).

 a. Networking/Communication Equipment b: Pos/Workstations can be considered to the communication of the communicat

E4339-X

B

More Enterprise Networking! Only \$42.95 51 Issues for \$48 Now Only

Yes, I want more. I accept your offer of \$42.95* for 51 weekly issues. That's a savings of over \$5.00 off the basic subscription rate.

First Name	MI		Le	st Name
Title	Compa	Company		
Address				
City	State		Zi	р
Address Shown: Ho	me Business	New	Renew	Basic Rate: \$48 per year

Please complete the questions below to qualify for this special rate.

- CORPORATE MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer



- Are you involved in the purchase or use of the following: (Circle all that apply) a Methoding/Communication Equipment b. Pox/Workstations c. Large Scalar/Midrange Systems d. Software . Peripherals

- E4339-X

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES FIRST CLASS MAIL MARION, OH 43306 PERMIT NO. 55 POSTAGE WILL BE PAID BY ADDRESSEE P O BOX 2044 MARION OHIO 43306-4144 Idadalladidaalladabaldadalla NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES **BUSINESS REPLY MAIL** FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306 POSTAGE WILL BE PAID BY ADDRESSEE P O BOX 2044 MARION OHIO 43306-4144

Idahalladhillaalladahallidadahallil

COMPUTERWORLD

Editor in Chief

Alan Alper

Alan Alper
Inical Sections Editor
lames Connolly
Istant News Editor
Patricia Keefe
Technical Editor
Charles Babcock nior Editors

> Nell Margolis anie M. Wexler Networking

nna Ambrosio ems & Software Ellis Booker anced Techno

Craig Stedman Midrange Systems

Ed Scannell rsonal Computin Saniur Willers ichael Fitzgerald linda-Carol Ballo Staff Writers

Features Editor loanne Kelleher

Maglitta, Corporate Stra Ory Zottola Dix, In Depth Mary Brandel, CW Guide Garry N. Ray, Firing Line Ilan E. Alter, Managemer Associate Edit

Assistant Editor Derek Slater e McCann, CW Guid

Intern Erin Callaway esearch Manager ael L. Sullivan-Trai

eurch Coordinator Kevin Burden Chief Copy Editor Anne McCrory ant Chief Copy Editor

tures Copy Editors mberlee A. Smith steven J. Condon Copy Editors Jill Zolot Ellen Fanning Richelle J. Keyo Jay F. Rizoli imberly Gilliard

Design Director Nancy Kowal

or Graphic Design Design Assistant Janell Genovese raphics Specialis Stephanie Fauche Jose E. Bruzual

rid Client/Server Jo an Johnson, Editor

g Editor of Special Projects atherine McCrorey News Bureaus Mid-Atlantic Hoffman, Corres

Washington, D.C. s, National Corres (202) 347-6718 hes, Senior Corre

Kim S. Nash Corresponder Chris Flanagan, Editorial Assist Midwest Ellis Booker, Bureau Chief (708) 827-4433

Main Editorial Office 9771, 375 Cochituate Road ingham, Mass. 01701-9171 (508) 879-0700 MCI Mail: 279-6273 mpuServe: 76537,2413 criptions: (800) 669-1002

The toppling of an American icon

Joanne Kelleher

emember that phrase, "Nobody ever got fired for buying IBM?" Sure you do. You probably even used it, although you're too smart to admit it now. These days people do get fired for buying in the reflexive, no-ques-

tions-asked way that gave rise to the motto.

What became of all the trueblue IS executives who followed IBM down one dead end too many isn't much explored in Paul Carroll's book, "Big Blues: The Unmaking of IBM. But those dead ends are, as are the organizational flaws that helped to topple a once seemingly unbeatable competitor.

Carroll, a Wall Street Journal reporter who covered the IBM beat, calls what happened to IBM "a sort of Greek trage dy," and that image certainly

fits. But so does another that's not quite so classical: Picture a winter night in the North Atlantic and a massive ship, reported to be "unsinkable," ploughing confidently through icy waters. One of the worst mistakes any company can make is believing its own PR, but IBM

believed it with a vengeance.

PAUL CARROLL

The Unmaking of IBM

The design

between

simplicity and

complexity is at

the core of the

systems

challenge facing

technology

professionals

today.

IBM was convinced the market would always wait to see what it had to offer, even after missing multiple opportunities and receiving clear signals that customers were more interested in price tags than initials. It also insisted that

it knew the best way to write software - scattering pieces of a project to a half dozen or so overstaffed teams around the world, virtually ensuring the resulting product would be both late and poorly focused.

Every once in a while, a particularly strong personality or unusual set of circumstances would allow a skunk-works operation thrive long enough to pull together an excellent product. But then, even if marketing resistance or political infighting didn't kill it off and the product actually succeed-

ed, it was chalked up as an anomaly, and it was business as usual the next time around.

There aren't many out-and-out villains in this saga, at least of the human variety. The real villain was a system of management that was allowed to thrive for so long it took on life

and power of its own. Anyone who wonders, for example, why John Akers didn't move faster, should read the section detailing negotiations to sell the Lexington, Ky., printer division. Akers had to personally intervene more than once to save that deal, and even then, the system, which gave everyone veto power, nearly killed it in the 11th hour.

That was one action regarding one division. Consider the size and scope of the changes required to remake IBM for the times, and then try the math on how long it would have taken without the shock of that \$5 billion loss

There were so many chances for different endings, so many "if onlys" along the way that it's hard not to label what happened willful selfdestruction. If only IBM had grabbed the exclusive marketing rights to 1-2-3 that Mitch Kapor offered. If only Bill Lowe negotiated a better



deal with Bill Gates in 1985. If only IBM had backed some of its own key research instead of letting others take the risks and the rewards.

This is, as Carroll says, a very sad story.

Kelleher is Computerworld's features editor.

No frills, fewer tangles

COUNTER INFORMATION by Michael Schrage

ith growing disbelief, I watched a Delta gate agent key in the details of my (completely standard) upgrade. Click ... click ... click ... I lost count somewhere after the 35th keystroke. Click... click... click... It was painful. Less than a week later, I flew Southwest Air-

lines for the first time. No upgrades, no boarding passes, no click ... click ... click. Instead, you're handed an ugly, numbered and color-

coded piece of plastic in the shape of California in the order you arrive at the gate, and you board accordingly. Southwest CEO Herb Kelleher swears nofrills ticketing saves his airline millions, is environmentally correct and lets him turn his planes around in half the time it takes American Airlines to do the same. That means more flights per plane per day. That, of course, means more money. For the moment, Southwest is making money. Most U.S. airlines are not.

Sure, Southwest uses computers. Who doesn't? But compared with a Delta, United, TWA or, especially American Airlines, Southwest is an unabashed technological moron. That's not by accident; that's by design.

Southwest's design priority is to create and manage simplicity. Delta's priority is managing complexity. The distinction is crucial.

There's a world of difference between viewing computers as a medium to create simplicity and viewing them as the best way to soak up more complexity. Keeping things simple poses a radically different design challenge than trying to manage complexity. Simplicity architectures just don't look like complexity architectures. Think of it as the difference between designing RISC and CISC processors.

This design trade-off between simplicity/ complexity is at the core of the systems chal-

lenge facing technology professionals today. Does "working smarter" in the 1990s mean making tasks inherently simpler and easier? Or does it mean giving individuals and enterprises the computational tools to better manage increased complexity?

Corporate America is split on this issue. General Electric's Jack Welch vehemently argues that most businesses are too complicated. KISS-Keep It Simple, Stupid — is GE's credo. To

Welch, it's clear that complexity is the sworn enemy of cost-effectiveness. In contrast, business gurus from Drucker to Senge to McKinsey & Co. maintain that organizations can't avoid complexity; they have to have the courage, creativity and consistency to manage it. Amoebas don't eat sharks. It takes complex systems to solve complex problems and exploit complex

For the most part, software designers have opted to design for complexity. Graphical user interfaces are used to prettify access to complex lumps of data. Query languages and neat data structures artfully conceal complexity. We rarely focus on the underlying complexity because we're getting so much better at cheating with the interfaces. Often, we use software to mirror external complexity because we can, rather than because we should. That often leads to diminishing returns.

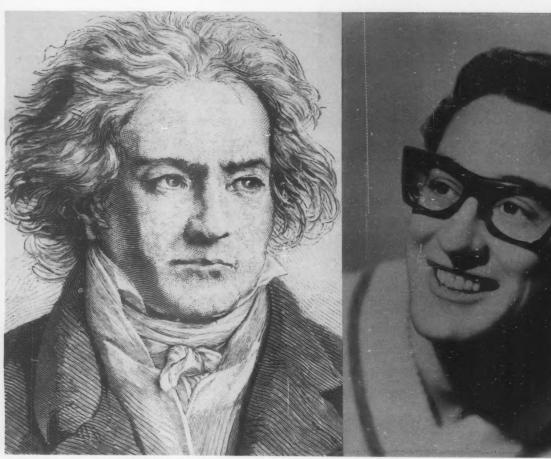
There's an awful lot of hoopla today about re-engineering" corporations and their systems. That would be encouraging if removing excess complexity were part of what's driving the movement. It isn't, though. Re-engineering is all about cutting costs. We're just so conditioned to the idea that value comes from additional functionality, that most organizations honestly believe they can't afford to stay simple in an increasingly complex world.



The sad truth is that most CIOs have gotten into the fixes they're in by promising to tame complexity. Perhaps they'd be better off if they emulated Southwest and used technology as a bridge to The New Simplicity.

Schrage is a fellow at the MIT Sloan School Center for Coordination Science and the MIT Media Lab. His Internet address is schrage@media-lab.media.mit.edu

Imagine they're software.



Ludwig van Beethoven

Buddy Holly

With the new IEF for Client/Server as revolutionary for information systems as notes were for music they could play in harmony.

The new IEF for Client/Server is as revolutionary for information systems as notes were for music. Like sheet music does for musicians, the IEF for Client/Server provides common access to structured, rule-based information. Just as a quarter note by Beethoven means the same as one by Buddy Holly, this new application development system provides common meaning to different client/server systems.

Built on a 5-year track record, market leadership for rapid application development tools, and a customer base that includes 50% of the Fortune 100, the IEF for Client/Server can help integrate the desktop, midrange and mainframe for unparalleled performance.

The entire application, including client, server and all communication components are developed and maintained as a whole from within a single IEF model. What's more, components can be reused in new client/server applications and deployed across different environments for encore performances.

Because analysis and design activities aren't restricted by the execution environ-

ment, developers can focus on defining and satisfying their individual business requirements without worrying about technology constraints.

The IEF for Client/Server allows in a single specification the flexibility to generate complete applications for a variety of execution and database platforms.

Which means that you can go horizontally, vertically or cross-enterprise on systems such as Microsoft,[®] HP,[™] IBM,[®] Sun,[™] NCR,[™] Sequent,[™] Tandem,[®] Digital,[™] Oracle[®] and Sybase,[™] All without missing a beat.

The IEF for Client/Server enables your business to rapidly respond to change which, in turn, increases your competitive position in the marketplace. And that's not all. TI offers products and services that effectively reengineer business processes and transition legacy systems to client/server technology.

All so you can extend your company's reach. And enjoy the sweet sound of success. For more information on the new IEF for Client/Server, call 1-800-336-5236, extension 1424 today.

Easier training.

Crosses platforms.

Enables change.

and

Based on IEF

integrated

CASE tool in

the industry."

Model-driven

flexibility.

the number one

EXTENDING YOUR REACH WITH INTEGRATION



"For 2 years in a row, IEF (Information Engineering Facility) has ranked first in the Integrated CASE Buyers Scorecard by Computernord magazine. IEF and "Extending Your Reach With Integration" are trademarks of Texas Instruments. Microsoft is a registered trademark of Microsoft Corp. HP is a trademark of Hewlett-Packard Co. IBM is a registered trademark of International Business Machines Corp. Sun is a trademark of Sun Microsoftens, Inc. NCR is a trademark of NCR Corp. Sequent is a trademark of Sequent Computer Systems, Inc. Tandem is a registered trademark of Tandem Computers, Inc. Digital is a trademark of Update, Inc. Digital is a

INTRODUCING REAL NODES FOR LESS THAN THE TYPICAL PSEUDO-QUASI-WANNAB AR-NODES.



DELL® NETPLEX® 425s/P i486® SX 25MHz SYSTEM

- \$1,165 BUSINESS LEASE \$43/MO. - 4MB RAM
- 120MB (17ms) HARD DRIVE 3 ISA EXPANSION SLOTS AVAILABLE
- 32MB MAX RAM
- LOCAL BUS VIDEO
 1MB VIDEO RAM
- VGA 800 MONITOR (14°, 800 x 600, .39m

- ONE DISKETTE DRIVE [3.5" or 5.25"]

 SPACESAVER KEYBOARD

 MS-DOS® 6.0/MICROSOFT® WINDOWS™ 3.1/MOUSE

Add an SMC Ethercard Plus Elite 16 Combo Card for only \$134 more, or chaose from five other network



DELL NETPLEX 433s/P i486 SX 33MHz SYSTEM \$1,494 BUSINESS LEASE \$55/MO.

- 4MB RAM
- 32MB MAX RAM
- 170MB (17ms) HARD DRIVE
 3 ISA EXPANSION SLOTS AVAILABLE
- . LOCAL BUS VIDEO
- UŁTRASCAN™ 14C MONITOR (14", 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE IS 5° or 5 25°
- SPACESAVER KEYBOARD
 MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE Add a 3 COM Etherlink III 3C509 (TPO or COAX) for only \$124 more, or choose from five other network

DELL NETPLEX 433/P i486 DX 33MHz SYSTEM

\$1,882 | BUSINESS LEASE | \$70/MO.

- · 4MB RAM
- · 32MB MAX RAM
- 230MB (17ms) HARD DRIVE
 3 ISA EXPANSION SLOTS AVAILABLE
- . LOCAL BUS VIDEO . 1MB VIDEO RAM
- ULTRASCAN 14C MONITOR (14°, 1024 x 768, .28mm, NI)
- ONE DISKETTE DRIVE (3.5" or 5.25").
- SPACESAVER KEYBOARD
 MS-DOS 6.0/MICROSOFT WINDOWS 3.1/MOUSE

Add an IBM® 16/4 Token Ring Card for \$465 more, or chaose from five other network interface cards

PROMOTIONAL PRICES. SAVE UP TO \$155. PRICES EXPIRE 11/2/93.

It's quite simple. If it says Dell NetPlex, it's a real node.

Dell's new NetPlex systems are PCs designed from the ground up to be network nodes. The result is a far more cost-efficient node, remarkably free of the usual set-up and maintenance hassles.

DELL NODES CAN BE UP AND RUNNING ON YOUR NETWORK IN AS LITTLE AS 4 MINUTES:

Open System Chassis N/A Done by Dell Install NIC Configure NIC 1 Minute Run Diagnostics on NIC Done by Dell Other Software Configuring 3 Minutes

4 MINUTES

N/A

WORKS WITH YOUR BUDGET AS WELL AS YOUR NETWORK.

The cost savings up front are considerable. Our node is priced below comparable PCs offered by our major competitors. And we save you time and resources by thoroughly testing our NetPlex systems for network compatibility. Then factoryinstalling your choice of six industrystandard network interface cards.

We'll also run NIC diagnostics, set jumpers and install your choice from 100 of the most popular software applications. All this, accomplished with one purchase order.

Our NetPlex systems have also been designed to be remarkably resistant to future shock. So six months down the road, when your users are demanding even more power in their computers, our PCs will be happy to accommodate them. All of the systems can easily be upgraded using Intel's powerful i486 Overdrive™ processor. You can expand up to 32MB of memory. Or add a high-speed SRAM cache.

CUSTOMIZED CUSTOMER SERVICE.

With Dell, you can pick and choose from a full menu of service options. We call it our SelectCare program. You pay only for the service you want, exactly as you want it. And not a penny for stuff you don't want or need.

When you do call us for technical assistance, you're guaranteed' help within five minutes, 24 hours a day, 7 days a week. Try finding that kind of service anywhere else. And since you deal directly with Dell, you get convenience and responsiveness other PC owners only dream of.

NO DUMMIES HERE.

But let's make sure we get one thing straight here. Just because we've made a node doesn't mean we've made any less of a PC. These are true high-performance business machines. With block mode IDE transfer that makes for a veritable data rocket. And with accelerated local bus video performance that's on perpetual fast-forward.

So call Dell and get yourself a real honest-to-goodness node. Not just some PC masquerading as a node.

DELL NETPLEX.
PCs DESIGNED SPECIFICALLY
AS NETWORK NODES.



800-225-4899

HOURS: MON-FRI 7AM-9PM CT SAT 10AM-6PM CT SUN 12PM-5PM CT IN CANADA, CALL 800-668-3021. IN MEXICO CITY, 228-7811. #11HF3



Close System Chassis

Guarantees available in USA only for registered owners of Dell Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax* line at 1-800-950-1329 or write Dell USA.L.P., 9505 Arboretum Blwd., Austin TX 8759-3299. Attention Guarantees. "Prices valid in the U.S. only, Some products and promotions not oscilable in Canada or Mesico. "Secup time represents network set-up only. Tasks were performed by a Dell Network Support Engineer." Beasing arranged by Leasing Group, Inc. The Intel Inside logs is a registered trademark and Windows is a trademark of Mescosft Corporation. Hill in a registered trademark of International Business Machines Corporation. End discious proprieturely interest in the mark and names of others. (1993 Dell Computer Corporation. All rights reserved.

Are Your Client/Server Tools Really Meeting Your Expectations?

We didn't think so.

Introducing Unify VISION. To Development Tool With The P

Now there is a new powerful tool that allows you to quickly deliver complex, graphical client/server applications, while freeing you from dealing with the complexities of networks, GUIs and databases. The tool is Unify® VISION. No other development tool can offer you the ease of use of PC-based tools, the industrial strength and team development capabilities of mainframe-class tools, and database intelligence – all in a single package.

With Unify VISION's unique SmartView development feature, you can build complex, large-scale graphical applications with minimal programming, reducing development time by up to 90%.

Enterprise
Cross
Department
Uniface
Unify
Vision

Vork Group
Personal

Personal

Enterprise
Cross
Unify
Vision

Power
Builder
Basic

Just point and click to choose application layout and move rapidly from definition to demonstration. And using the underlying Database Smart™ technology, your



Using SmartView dialogs, you can specify form hehavior without coding. application performance is automatically optimized for your database, while protecting data integrity. Unify VISION's powerful cross-

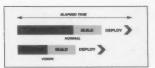
platform environment supports UNIX, Microsoft Windows, Macintosh, and Windows/NT and allows development for the most popular operating systems, databases and GUIs. Applications can be distributed to both client and server, wherever they work best.

Unify VISION is the only client/server application development tool to support the development of complex, production-quality applications in a highly automated, easy to use environment.



The Client/Server Application Power You've Been Waiting For.





With Unify VISION, you can go from application concept to deployment in a fraction of the time of other 4GL tools.

To meet team development needs, Unify VISION's object-based architecture allows reuse of objects, interactive debugging and integration of third party tools, including configuration management. And for enterprise-wide development, Unify VISION provides simultaneous access to multiple databases and to both mainframe and PC data.

Unify VISION – the only client/server tool with the power and ease of use to meet all your expectations.

Finally, the client/server tool you've been waiting for.

By combining graphical point-and-click programming with the industry's most powerful 4GL, development time is reduced by up to 90%.



Seeing Is Believing.

See for yourself why Unify VISION has the kind of power you need to rapidly build complex, large scale applications. Call (800) UNIFY-IT and receive a free copy of our video: The Power of VISION.

After you take a closer look at the impressive capabilities of this extraordinary new client/server application development tool, you'll see that Unify VISION really is the client/server tool you've been waiting for.





Unify Corporation 3901 Lennane Drive Sacramento, CA 95834-1922

Compaq hopes combo portable strikes chord

By Michael Fitzgerald

Compaq Computer Corp. is counting on its recently released Concerto pen and keyboard portable PC as the company treads into new territory.

Besides allowing a pen and keyboard to be used in concert, Concerto represents many firsts for the company. It is Compaq's first effort with pen input, the first Compaq product to support the PCMCIA standard and the first effort to bundle Compaq-specific software with a portable.

Trying to avoid the stigma of pen computing and comparisons with Grid Systems Corp.'s Convertible, Compaq is billing Concerto as a notebook that happens to have pen capabilities. It does, in fact, look like a pen-based system with an attachable keyboard.

"I consider it a convertible because it combines pen and keyboard," said John Fell, PCLAN specialist for sales systems at the Moore Business Forms and Systems Division of Toronto's Moore Corp.

Fell said he currently has 30 Grid Convertibles in the field and is testing Concerto as a 486-based replacement for those systems.

Eye-catching setup

Whatever it is, Concerto will at least draw some looks. Its detachable keyboard sits at a desktop-like 10 degree angle when in note-book format. A handle attached to the screen props up the display and allows for easy adjustment of the display angle.

The pen, besides acting like a pen, also replaces the mouse.

Compaq's Concerto

Processor: 25-MHz or 33-MHz 486St. Weight: 6½ pounds, 5.2 without the keyboard. Hard file: 170M-or 250M-byte. Slots: One Type III. PCMCIA: pen interfaces. Bundled software: Windows for Pen Computing, Ink Development's NoteTaker, Slate's Pen Power for Excel.

Base price: \$2,499.

Fell said the pen is a plus for his users. "For our sales automation project, we need the flexibility of having full keyboard capability but want to use the pen for some situations," Fell said.

Lateentry

Compaq's use of the PCMCIA standard brings the company in line with portable computing's major players. Compaq has attempted to make up for its tardiness in implementing the standard by building in a utility that posts information on whatever PCMCIA card is in use.

The utility will turn off power to the power-hungry cards when they are not in use. A Compaq official said this could save as much as 30% of the battery life.

Included with Concerto is DOS 6.0, as well as Microsoft Corp.'s Windows for Pen Computing, Ink Development Corp.'s NoteTaker memo program and Slate Corp.'s PenPower for Excel, a new utility that makes Microsoft's Excel spreadsheet program work exclusively with the pen. The Ink and Slate products were developed with some input from Compaq. The products will sell on retail shelves and for the first year Compaq will be the only hardware vendor that can bundle them.

While Compaq bills Concerto as a notebook, Compaq executives were quick to say that future products in its flagship LTE Lite notebook line will not have the same feature set as Concerto.

Separately, Compaq cut prices on its LTE Lite family by up to 18%. A base model LTE Lite 4/25 now costs \$2,199 with a 120M-byte hard drive.

Quattro Pro for Windows excels despite learning challenges

By Garry Ray

It is hard to imagine that a full-featured, competitive spreadsheet could be had or a paltry \$50. But Borland International, Inc. in Scotts Valley, Calif., has pulled it off once again with Quattro Pro 5.0 for Windows.

PRODUCT

The company, which rose to acclaim a decade ago with its dirt cheap Pascal compilers, is known for stuffing tons of features into low-cost packages. Witness its series of under-\$100 databases, Pascal and C++ compilers,

debuggers and other technically advanced software tools. With all that technical backing, it should come as no surprise that Quattro Pro 5.0 includes the same polished advancements as other Borland products. But polished does not necessarily mean perfect, and some design issues in Quattro Pro 5.0 could stand improvement.

Feature-rich

On the plus side, Quattro Pro 5.0 is a power-packed Windows spreadsheet that includes just about every conceivable analytic and presentation feature users might want. Of course, the spreadsheet includes the standard array of @ functions (more than 360, according to Quattro Pro documentation) and macro commands, along with the standard font, styling and presentation capabilities

conferred by Windows. However, these obligatory spreadsheet features are bolstered by additions such as data modeling tools similar to Lotus Development Corp.'s Improv, "experts" that automate activities such as charting and spreadsheet consolidation; and on-line, interac-

tive tutorials.

A \$495.95 version of the spreadsheet (dubbed the Workgroup Edition) permits data sharing through LANs and telecommunications networks.

With all these new features, Quattro Pro for Win-

dows presents a formidable learning challenge even to experienced spreadsheet users. Some of this is eased with a series of on-line, interactive lessons called SpeedTutors that are targeted at new spreadsheet users. But with topics such as "Entering numbers" and "Moving a block," these are far too basic to cover the complex questions experienced users might ask. There is no similar coverage for the sophisticated data modeling tool, the scenario manager or for most complex spreadsheet questions.

Another learning aid is the set of Quattro Pro Experts, which provide step-bystep guidance for creating graphics, building scenarios, consolidating worksheets, compiling formulas and building statistical analyses. The Experts ask a series of questions and ultimately produce the desired result. These will be of use to both novice and

Like all contemporary spreadsheets, the Quattro Pro features list is extensive. Matching its primary competitors — Lotus' 1-2-3 for Windows and Microsoft Corp.'s Excel— Quattro Pro also

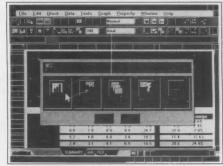
includes a graphical draw layer with a complement of drawing tools, drag-anddrop of selected spreadsheet blocks, automatic block formatting and an automatic chart building feature.

On-line inspector

Block and cell operations are augmented by Borland's Object Inspector, which is invoked with the right mouse button. The Object Inspector provides access to a varriety of operations according to the type of object being examined.

For example, the Object Inspector presents a pull-down menu to allow formatting, charting or editing operations if a block of cells is "inspected." If a notebook tab is selected, the Object Inspector will provide a menu of changes that can be made to notebook characteristics such as protection, spreadsheet grids and default numeric formats.

Those who customize spreadsheets for others will appreciate the array of



Quattro Pro Experts give users step-by-step guidance for creating graphics and performing other functions

tools to create menus, macros and custom SpeedBars (Borland's equivalent of Lotus' 1-2-3 Smartleons). The macro creation tool allows keystroke capture and editing, and macros can be linked to spreadsheet "buttons" for point-andclick macro execution.

While it is difficult to criticize any product that delivers the range of features and functions found in Quattro Pro for Windows, users might be surprised by the number of "hidden" features they must unearth to use the spreadsheet to its fullest potential.

For example, we were becoming concerned about the time needed to "grab" a selected block for movement to another section of the spreadsheet. It was only in a passing reference in the documentation that we discovered that "delay time" can be adjusted using one of the Object Inspectors.

In operation, Quattro Pro 5.0 was rela-Quattro Pro, page 42

Macintosh users get ready for Unix

More than

applications and

thousands more

applications will reportedly run

on the

PowerOpen

platform.

By James Daly

It is never too early to plan for what is coming around the next technological bend, and for a lot of Apple Computer, Inc. Macintosh users these days that

By the middle of next year, the Apple/ IBM technological alliance will unveil one of its bedrock technologies: Power-Open, a next-generation Unix. Though it sometimes gets lost in all the noise about Taligent and PowerPC, PowerOpen will likely be just as important.

Many users reportedly hope the Macintosh's traditional ease of use will make it easy for users to embrace Unix. Although Unix offers tremendous flexibility to skilled practitioners, its technical intricacies have scared potential users.

"The complexity of Unix can be quite daunting," said Robert Keim, director of in-

formation, management and system technology at the College of Business at Arizona State University in Tempe.

Unix difficulties

Apple has had a Unix offering since 1989, when it introduced A/UX. The problem with A/UX, however, is that like most Unix versions it is not immediately intuitive. Thus, its user base has mostly been limited to the scientific and academic user communities.

By weeding out those technical challenges - and adding many more applications to the existing A/UX software base — PowerOpen could help change those demographics, initiating a rapid

shops. The MacIS user group even plans a special session to discuss PowerOpen at its November conference in Orlando, Fla. Some users said they also plan to develop training classes during the next few months to acclimate users to Unix.

"We have high hopes for PowerOpen," said James Yip, who supervises more than 3,000 Macintoshes as a manager of technical services at Ernst & Young in Toronto. Yip said his organization brought in 30 Apple Workgroup Server 95s early

this month, giving many users their first taste of Unix. "If [PowerOpen] works, it will insulate users from the complexity of Unix, while still giving [them] access to its power," Yip said.

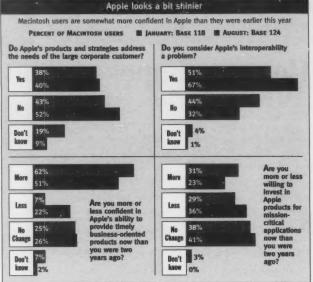
PowerOpen will be based on IBM AIX 4.1 but will also encompass elements of A/UX. Users will need a machine running a PowerPC chip to take advantage of

PowerOpen. Apple and IBM officials have also promised backward compatibility for A/UX and AIX applications.

PowerOpen is enjoying wide support in the industry, with more than 100 players such as Thomson SA, Bull HN Information Systems, Inc. and Harris Corp. committed to shipping PowerOpen-compliant systems.

PowerOpen will also ship with a widespread application base: More than 12,000 existing AIX applications and thousands more A/UX applications will reportedly run on the platform.

The PowerOpen specification is still under development and should be completed by the first quarter of next year,



according to Pat Riemitis, vice president of marketing at the PowerOpen Association in Burlington, Mass. Full availability of PowerOpen is expected by next June.

What's next

Apple also has other irons in the Unix fire. At its developer's conference in May, Apple announced that it is cooperating with IBM, Sun Microsystems, Inc., Hewlett-Packard Co. and Unix System Laboratories, Inc. to put the Macintosh user interface on machines running Unix. The payoff would be that programs written for the Macintosh would be able to run, unchanged, on Unix workstations.

Specifics were hazy: No time frame was announced, nor were Apple officials certain whether users would require two sets of tools to build front-end services for Macintosh and Unix applications.

Some analysts said this approach could backfire, particularly with companies that have many Unix machines in

"It's a strategy that could actually blow up in Apple's face if it's not careful,' said Tim Harmon, program director for desktop computing strategies at Meta Group, Inc. in Westport, Conn. "Why pay for a Macintosh when you can get a much cheaper Unix box with a Mac interface?"

Harmon said that while a Macintosh designed for Unix might cost \$2,000 or more, a Brand X workstation could undercut that price by \$500 or more.

Still, many users said they think Unix is going to be a big part of the Macintosh's future "You have to look out three to six years," Keim said. "And I think you'll see that PowerOpen will be a key part of many corporate Mac shops."

Quattro Pro

CONTINUED FROM PAGE 41

tively speedy and on par with 1-2-3 Release 4.0 for Windows. But users might bristle at the nearly 16M bytes of disk space required for program installation. Granted, that space delivers a lot of features. But users are advised to run Quattro Pro using the Windows SmartDrive disk cache because on our system the program was constantly swapping program modules to and from the disk

The flip side of Borland's vaunted object-oriented technology is that you will need plenty of hardware resources to use it to its fullest

In all, Quattro Pro 5.0 for Windows delivers the sort of features and performance for which Borland is recognized. Certainly, there are more than enough features to keep Quattro Pro in the spreadsheet competition with Lotus and Microsoft. But as always, this new version of Quattro Pro also offers enough enhancements and added features to prove that Borland still knows how to up the ante.

Compaq tries for bite of Newton pie

By Michael Fitzgerald HOUSTON

Compaq Computer Corp. said it would use a little help from its friends to build its answer to Apple Computer, Inc.'s Newton personal digital assistant.

Accordingly, Compaq, Microsoft Corp., Intel Corp. and VLSI Technology, Inc. have announced a cooperative effort to develop Mobile Companion, a new handheld device that will use a new operating system from Microsoft and a new chip set co-designed by Intel and VLSI. The firms have not, however, committed to when the handheld device will be delivered.

The partnership will take a significantly different tack from Newton, one analyst said. Newton "is for taking down new data and transferring it to the desktop, while Mobile Companion is a way to manipulate data already on desktops and LANs," said Randal Giusto, an analyst at WorkGroup Technologies, Inc. in Hampton, N.H.

Microsoft's operating system is At Work for Mobile Companions. Codenamed WinPad, it was recently licensed by Toshiba Corp. and also ties in to Microsoft's strategy for putting the Windows interface on office equip-

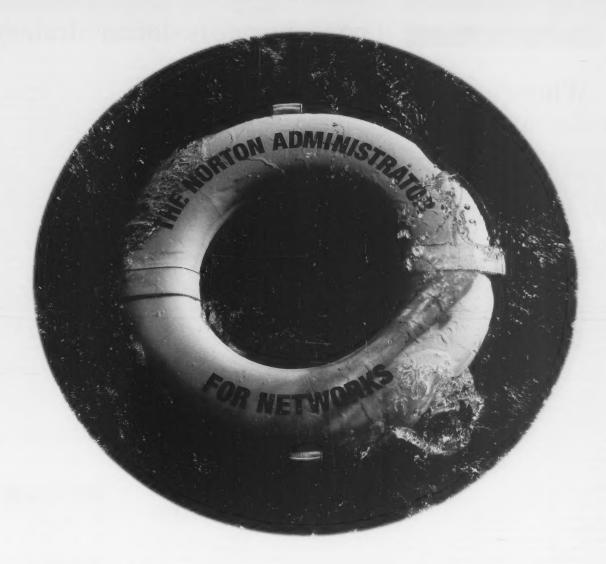
At Work will maintain compatibility with Windows through a subset of the Windows application programming interface, but it will be different from Windows, said Steve Ballmer, Microsoft's senior vice president of sales. For instance, "the current user interface with overlapping windows is probably not appropriate" for At Work, Ballmer said.

Also, while At Work can communicate with current Windows applications, it will not be able to run them, he added. The operating system will be burned into read-only memory to cut down on battery use and eliminate the need for drives to store it.

Microsoft is scheduled to deliver a preliminary software developer's kit this week at its developer's conference, according to Bjorn Hovstadius, group product manager of handheld systems at Microsoft.

The Intel/VLSI chip effort came to light last week when the companies unveiled the Polar chip set, a version of Intel's 80386SL with more functionality integrated on-board the chip.

Compaq did not say when it would ship its Mobile Companion, nor was it clear whether Compaq would be the first to ship one. Officials from the four firms said they were attempting to create momentum behind a standard that would make it easier to build and bring these types of devices to market.





Peter Norton comes to the

Okay, you can stop holding your breath. The solution to your toughest networking problems is within reach. Peter Norton's latest lifesaver is a complete set of integrated tools to rescue you from the reduced resources, budgets and timelines that are threatening to sink your network.

With Norton Administrator for Networks you're able to distribute software, meter application usage and inventory your entire network from one central location: namely, your desk. Even if you're managing an organization that's comprised of different network operating systems.

Right from the start, Norton Administrator will begin paying for itself many times over in time savings alone. Of course, the reduced

aggravation, frustration, and wear and tear on your running shoes is pretty nice, too.

If you'd like to receive more detailed information via fax, please dial 1-800-554-4403 select option #1 and request document #486. You'll be grabbing hold of a real lifesaver.

NORTON ADMINISTRATOR FOR NETWORKS

SYMANTEC.

W. D. Riley

Where are my color notebooks?!



It's time for the big computer manufacturers to put up or shut up, and they can start with color notebooks.

It's been about a year since the active-matrix color notebook computer was introduced, and I suspect the only way you can get one involves a disembodied voice whispering "pssst" from an alley.

Product introductions used to be simple from the buyer's point of view. Someone invented something, produced it, advertised it and sold it. This system worked pretty well, but stand by, because it seems the computer industry, already known for its "guess your shipping date" attitude, has a few changes in mind. Apparently, vendors think the way the process should work is that you invent something, advertise it, presell it and then scramble around for enough parts to put a few together. Sadly, computer buyers are sitting on their hands and simply accepting this egregious behavior when they ought to be protesting loudly and switching computer companies

There can be no finer example of this nonsense than IBM and Compaq and the color notebook fiasco. Forget the minor ProLinea shortage, a foreseeable mistake that probably sent many Compaq customers screaming into the night. And forget the yearly shortages that plague our industry, jack up prices (big surprise) and slow down deliveries.

This time it's personal.

As simple as this problem seems, it is apparently beyond the control of these two companies. While Compaq and IBM supposedly produce their own notebooks, they rely on outside sources for the most critical part of the box - the color

Wildly anticipated

While the creation of the 486 notebook wasn't exactly a feat of engineering derring-do, the active-matrix monitor was pretty heady stuff. For the first time since the beginning of the computer revolution, the portable computer user would have a fast machine and a great monitor. Early reports had it looking better than the equivalent full-size VGA monitor, and while that may be stretching the facts a little, it was much better than anything that had preceded it.

To the mobile user, it was the dream desktop replacement. All Compaq and IBM had to do was get the thing to market. The rest would have taken care of itself.

But somehow these wise and powerful companies didn't see the shortage coming. If the facts are any witness, no one had the foresight to ask the people making the monitor one simple question: "Just how many of these things can you guys make?"

Disasters such as factories burning down aside, this kind of thing is just inexcusable. I have my own problems. As a corporate buyer, I base long-range decisions on incoming equipment. Projects are defined, people are shifted and software is ordered on the assumption that the equipment will arrive on time. Furthermore, I have clients who have waited patiently for months now, and I have to tell them there are still no color portables in sight.

This fumble, following the ProLinea shortage from Compaq and IBM's inability to deliver its ValuePoint products, will cause me to take a closer look at Dell, Gateway and other manufacturers with more foresight.

Somebody should have seen this one coming.

Riley is microcomputer support manager at the City of Hope National Medical Center in Duarte, Calif.

Conner broadens storage strategy

By Stephen P. Klett Jr.

Conner Peripherals, Inc. in San Jose, Calif., recently unveiled a marketing strategy and product set aimed at bringing the company back into the black after a series of quarterly losses.

Conner's "Storage Solutions Initiative" targets four markets and customer classes: entry, value, performance and portable. New and refreshed products range from disk drives to hierarchical storage management systems with capacities and price points specific to each segment. These products will gradually phase out Conner's current product set.

"Right now we have too much supply for our current demand," said Chief Executive Officer Finis Conner. "Couple this with the transition occurring from low-capacity to high-capacity drives and the PC price wars and you have all the condiments for a tough situation. This strategy marks an attempt to rid ourselves of products that are stuck in price free falls."

Beyond disk drives

The initiative is an extension of Conner's announcement in June 1992 that it would extend its business to become more than a disk drive manufacturer. The move into the tape and software markets was fueled by its December acquisition of Archive Corp.

"If you are just in any one of these markets—given the present level of competition - you end up selling your product by the pound," said George Rea, executive vice president at Conner's Storage Systems Group. "It's a deadly strategy to continue selling along one product

line. This appears to be the case for Conner, which posted losses of \$22.5 million and \$58.8 million for the first and second quarters, respectively, and has projected a loss for the third quarter as well.

Analysts said the initiative shows that Conner - once the fastest growing disk drive manufacturer in the U.S. - has real-

ized that its heyday in the disk drive market has ended and that it has to find other avenues for growth.

CEO Finis Conner:

Strategy is an at-

tempt to get rid of products stuck in

price free falls

"They're in a tough hole to get out of," said Phil Devin, a senior industry analyst at Dataquest, Inc. in San Jose, Calif. Devin said he believed Conner had chosen the proper path to return to profitablity but added it would be a slow climb. "They have all the resources in place, but the question remains as to how soon they can deliver the new products in quan-

Conner acknowledged that the company can no longer count on growth in disk drives sales and that tape now represents Conner's largest market opportunity for the future. While Conner said only 5%

> of PCs shipped last year had a tape drive added after market. he expects this to jump to 20% during the next couple of years and believes this initiative positions Conner to take advantage of this growth.

The new strategy "helps us turn things around quicker for our customers," said Felix Lomangino, principal at Computer Partners, a disas-

ter avoidance and recovery company in Mobile, Ala. "It solves the logistic problem of having to figure

Lomangino said he believed Conner's strategy to focus on the tape market was sound. "We've seen demand for tape products really escalate, which is driven by hard drive media. It's very hard to back up 500M-byte drives on floppies; people are very open to tape for backup and recovery solu-



By Ellis Booker

Hoping to satisfy the rising interest in multimedia, disk drive maker Micropolis Corp. in Chatsworth, Calif., last week introduced a line of what analysts said are the first magnetic drives designed specifically for digital audio/video applications

The 31/2-in. 2200 AV Series drives. which offer storage of 1.05G and 1.76G bytes, have been optimized to deliver data in long, sequential

Standard drives transfer data in bursts, which, while suitable for data processing applications, can cause trouble for digital video applications that require a minimum sustained data transfer rate of about 3M byte/sec.

Micropolis uses the latest SCSI technology to achieve a maximum sustained and uninterupted data rate of 2.9M byte/sec

Micropolis claimed that its new drives will save users the expense of extra hardware, software and RAM cache buffers, which today compensate for delays in transferring digital video streams off magnetic media. "We believe getting the tools right is half the battle, said David Guo. Micropolis marketing manager.

Bob Katzive, vice president of Disk/Trend, Inc., a research firm in Mountain View, Calif., noted that some optical disc drive makers have attempted similar firmware changes to their products. "But I believe Micropolis is the first with a complete effort for a magnetic drive," he said.

Katzive said he is not sure, however, whether other makers of high-capacity drives will follow Micropolis' lead.

The 2200 AV Series 1.76G-byte drive will cost 2,440; the 1.05G-byte version is priced at \$1,642. Both drives will be available next out who's got what where.

Briefs

Apple success Apple Computer, Inc. Chairman John Sculley said Apple's Newton Message Pad has sold 10,000 units in

its first month of availability. despite reports of power problems and handwriting recognition difficulties. Full national availability of the MessagePad, however, only began earlier this month.

Database deal

Software Publishing Corp. in Santa Clara, Calif., recently dropped prices on its Superbase 2.0 Windows relational database management system. **Current Superbase users** can upgrade to Release 2.0 for \$99, which is priced the same as Lotus Development Corp.'s Approach database. Single-user pricing for Superbase is \$495, reduced from \$795. A single license for Lotus' Approach is \$395.

WINDOWS NT. NOW THE ONLY DIFFERENCE BETWEEN A PC AND A MAINFRAME IS ABOUT 900 LBS.



There's a new breed of hardware, with vast reserves of power. And the Microsoft° Windows NT™ operating system unleashes it all.

How? It gives you a platform for mini- and mainframe-class applications. In short, it lets you revolutionize the way you do business.

Now you can run a new generation of 32-bit applications (over 2,000 will be out within months). What's more, you can run them on

everything from desktops to the most powerful superserver—all the while running your current MS-DOS° and Windows applications, and getting support from 15,000 professionals.

Plus, you can do it all in your existing computer environment. So call (800) 426-9400, Dept. KQ8, for a reseller nearby. And lose weight today.

Microsoft

Making it easier



© 1999 Microsoft Corporation, All rights reserved. Printed in the USA, Microsoft and MS-DOS are registered trademarks and Windows, the Windows logo and Windows NT are trademarks of Microsoft Corporation. For more information: In the 50 United States, call 1000 150 Caroline Computer (1000 150 Caroline Computer Compute

Desktop Computing



The solution to vour DOS/VSE, OS/MVS. and CICS system software problems just has to be in here somewhere!

- . BIM-ARCHIVE Report Archiving System
- BIM-BLDINDEX VSAM Alternate Index Build Utility
- BIM-BUFF Dynamic VSAM Buffering (now w/MVS support)
- BIMCMPRS CICS 3270 Data Compression System (enhanced)
- BIMCNSOL Remote/Alternate Console and Console Message Redisplay
- BIM-COBOLMATE Reformats standard COBOL output, reduces printed output 40%
- BIMECHO CICS Screen Duplication and Demonstration Facility
- BIM-EDIT DOS/VSE and OS/MVS On-line Program Editor System
- . BIM-FLEET RJE File Transfer Utility
- BIM-FMAP On-line CICS MAP Generation Facility
- . BIM-ICCF Access to CICS transactions from within ICCF
- . BIM-JOURNAL VSAM Batch Journaling
- . BIM-IMASTER Journal Archiving and Control
- BIM-LMON VSE Phase Load Monitor
- BIMMONTR DOS/VSE System Status, Performance, & POWER Queue Display
- BIM-ODIS On-line CICS System Status Display
- ODISTRAK Optional feature used to record major CICS statistics
- . BIM-PACK Automatic VSAM File Compression (now w/MVS support)
- BIM-PADS DOS/VSE POWER Alter-Delete System • BIM-PC/TRANSFER - DOS/VSE to and from PC file transfer utility
- · BIM-PRINT Simple and complete control of remote printing and viewing
- VMPRINT Optional feature that provides VM Spool Queue Access
- BIMP3270 CICS CRT Screen Print Facility
- . BIM-QCOPY -The POWER/VSE Report Utility
- BIM-RECOV CICS VSAM Recovery
- . BIMSERV DOS/VSE Library Display
- BIMSPLIT Break DOS/VSE Print Listings into Multiple Jobs
- BIMSPLSR BIMSPOOL Laser Printer Support
- BIMSPOOL DOS/VSE Batch to Terminal Printer Spooling
- . BIMSPOON DOS/VSE On-line to Batch Print Spooling
- BIMSUBMT DOS/VSE On-line Job Submission
- BIMSWAP BTAM Terminal Swap Facility
- BIM-TMAN VTAM Access to DOS/VSE Console
- BIM-VIO DOS/VSE Virtual Disk Drive and Standard Label Area Product
- BIM-VSHARE OS/MVS Multiple Region VSAM File Sharing Product
- . BIM-VSUM Design-Analysis Tool for MVS VSAM
- BIMWNDOW VTAM Multiple Session Manager

BIM programs start at \$800 and average \$2500. You can save even more money with our group package offerings. Products are available on permanent, annual, or monthly licenses, and shipped on a 30-day free trial basis. Product documentation is available on request or ask for a copy of our summary manual.



B I MOYLE ASSOCIATES, INC. 5788 Lincoln Drive • Minneapolis, MN 55436 612-933-2885 • Fax 612-933-7764

Member Computer Consultants Association

Software

The Pendulum Group, Inc. has announced Version 2.0 of the Auto-Might Professional, an automatic event processor and keyboard macro package that permits users to schedule programs to run automatically when a computer is unattended.

Version 2.0 consists of two memoryresident utilities, a keyboard macro utility called AutoKey and an event processor, according to the Englewood, Colo., company. The utilities can be used together or independently.

Features include an expanded keystroke field, a "record mode" that memorizes keystrokes to be used in events or as hot keys, security options, larger event files, additional network compatibility, DOS 6.0 compatibility and easy-installation procedures.

Auto-Might Professional costs \$169.

▶ The Pendulum Group (303) 781-0575

Agfa, the imaging division of Miles, Inc., has introduced Version 1.1 of its Foto-Tune Color Management Software.

Enhanced color capabilities for Macintosh and PC platforms are provided in this version.

According to the Wilmington, Mass., company, FotoTune 1.1 Color Management Software delivers color consistency across a range of devices, including monitors, scanners and printers. Features for the product include a Tag Image File Format importer and scan plug-in module, calibrator software, compatibility with Apple Computer, Inc.'s Apple Colorsync and new color tags.

FotoTune 1.1 costs \$795.

► Agfa (508) 658-5600

Hardware

Quantum Corp. has announced the Go-Drive GLS series of 21/2-in. hard disk drives for subnotebooks and standardsize, advanced notebook computers.

According to the Milpitas, Calif.-based company, the drives offer capacities ranging from 85M to 256M bytes, a selection of drive heights from 121/2mm to 19mm and a variety of features designed to boost drive reliability and ruggedness.

Single unit pricing for the Go-Drive GLS series 85M-, 127M-, 170M- and 256Mbyte drives is \$250, \$300, \$350 and \$425, respectively.

▶ Quantum (408) 894-4000

Identity Systems Technology, Inc. has announced Identity, a 486SLC-based notebook computer that features a 500Mbyte Maxtor Corp. hard disk with an access speed of 8 milliseconds, according to the Richardson, Texas-based company.

Identity's features and options include a Cyrix 486SLC/33-MHz microprocessor, a built-in 31/2-in., 1.44M-byte high-density

floppy disk drive, a socket for optional math coprocessor chip, 80-column by 25line text resolution, two nine-pin serial ports and one parallel port.

Identity costs \$2,995 in a configuration with 4M bytes of RAM, MS-DOS 5.0, Windows 3.1 and MS-Works.

▶ Identity Systems Technology (214) 235-3330

Logisys, Inc. has introduced the VAR 486SLC/33-MHz Dual Scan Color and the VAR 486SLC/33-MHz Active Color, highperformance flexible notebooks.

The models are based on the Cyrix 486SLC/33-MHz chip, and they come with 4M bytes of RAM, a 200M-byte hard disk and built-in coprocessor, according to the Anaheim, Calif.-based company,

MS-DOS is preinstalled, and each model weighs 6.6 pounds. Options for both models include a second RS-232 serial port, trackball, fax/modem and Ethernet 10Base-T.

The VAR 486SLC/33-MHz Dual Scan Color and the VAR 486SLC/33-MHz Active Color cost \$2,350 and \$3,299, respectively.

► Logisys (714) 693-1888

Dolch Computer Systems has announced the Rack-300 series of ruggedized, 14-slot, rack-mount PC platforms.

According to the Milpitas, Calif., company, the use of onboard parallel and serial ports, SCSI connections and integrated drive electronics reduce the need for plug-in boards. The systems deliver up to 271/2 MIPS, Dolch said.

Pricing for the Rack-300 systems begins at \$2,900.

▶ Dolch Computer Systems (408) 957-6575

Product shorts

Delrina Corp. has announced updated Windows and Macintosh versions of The Far Side Daily Planner and Calendar Publisher, an electronic theme-based daily planner with a year's supply of animations and cartoons. The Far Side Daily Planner and Calendar Publisher features an address book, file importing and exporting, and sorting, searching and printing capabilities. Integration with Delrina's WinFax Pro is provided. Cost: \$59.95. Delrina, Toronto (416) 441-3676.... ATI Technologies, Inc. has introduced Graphics Ultra Pro VLB, a VESA local bus graphics card that employs ATI's mach32 graphics controller. The card can display high-resolution graphics up to 1,280 pixels by 1,024 pixels at 74 MHz and up to 16.7 million colors at 800 pixels by 600 pixels. Cost: \$499. ATI, Toronto (416) 882-2600.... Timeworks, Inc. has introduced Timeworks Translate It, a series of whole-document, bidirectional, foreign language translation programs for DOS-compatible computers. Available in three versions - English to/from Spanish, English to/from French and English to/from German the product can translate entire documents at once with full-sentence, idiomatic accuracy. Cost: \$99.95. Timeworks, Northbrook, Ill. (708) 559-1300.

Windows NT.

The difference between us and other computer companies is we actually know something about it.

More than any other computer company, in fact. That's because we've worked with Microsoft since the inception of Windows NT* to help you make the most of the new operating system.

Hardware: Get Windows NT on the platform of your choice:

affordable Intel*486s, high performance Pentium* PCs and now

available, Windows NT on the 150MHz DECpc" AXP 150," the

below then call Digital to find out why we're the ideal choice to help you seamlessly

integrate Windows NT, while preserving the hardware, software and networking you've already got. You want someone to help you learn

about Windows NT. Why not pick the

one computer company that's not

resource kit or for more information on Digital PCs running Windows NT.

still learning themselves? Call today

64-bit AXP,™ world's fastest microprocessor.

1.800.210.8322, priority code BKR, for your free "Windows NT from Digital"

world's most powerful PC. **Support:** We bring you more Windows NT training, service and support in more locations than anybody else. Check the partial list

Worldwide Service & Support for Windows NT Full installation, plus integration of legacy hardware, software, operating systems. Training for managers, end-users, technicians and developers.

Support for downsizing host applications and developing new client/server applications.

Now available, the Alpha AXP" version of Windows NT

on the DECpc AXP 150.

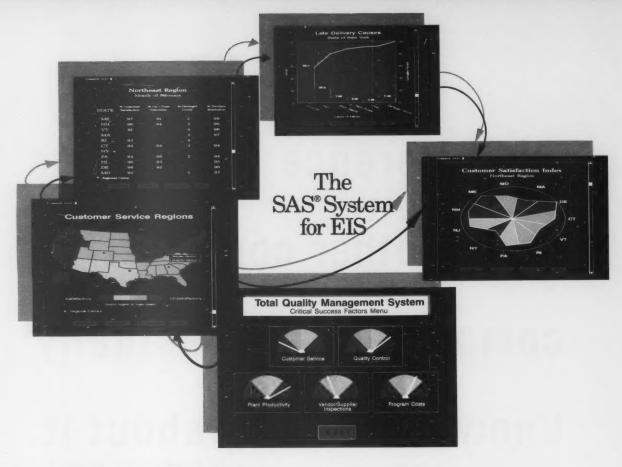
24-hour advisory & help desk technical support. Maintenance available 24 hours, 7 days a week. Multivendor service to support Windows NT on any manufacturer's system or network. Alpha AXP* software developers program.

PUTTING IMAGINATION TO WORK

I magine that.

digital

All products referenced herein are trademarks of their respective companies. Products are sold pursuant to Digital's standard terms and conditions. @1993 Digital Equipment Corporal



The Difference Between Face Value and Real Value

It takes more than a fancy front end to make a fullfunction Executive Information System. To be of *real* value, an EIS must deliver the right information to the right people at the right time...to support strategic decision making. That's why you need the SAS System.

Software that's Changing the Face of Information Delivery

Of course the SAS System gives executives such EIS "basics" as up-front menus...pull-down windows...drill-down, traffic-lighting, hot-spotting, and exception reporting... graphical display of critical success factors...and desktop productivity tools such as calendars, notepads, a letter-writing facility, and access to native electronic mail.

But the benefits of the SAS System extend far below the surface. As the world's leading information delivery system, the SAS System provides *total* control over data access, management, analysis, and presentation. Executives can directly access all kinds of data sources—including data locked away in database management systems. And they can analyze and present data using

specialized tools for project management, forecasting and financial reporting, and hundreds of other tasks... all fully integrated.

Information managers can build a custom-tailored EIS... in far less time, and using fewer resources, than it takes to force-fit an off-the-shelf solution into *your* organization. And because the SAS System is entirely portable, you can integrate data and applications from different computing environments into a single, company-wide information delivery system.

Free Video Preview...Call Today.

There's more to the SAS System for EIS than meets the eye. Call us now at 919-677-8200 to arrange for your free video preview...plus details about a no-risk software evaluation and upcoming SAS System executive briefings.



SAS Institute Inc.
Software Sales Department
SAS Campus Drive
Cary, NC 27513
Phone 919-677-8200
Fax 919-677-8123

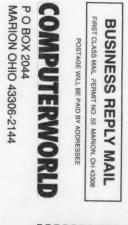
LIRGE	IT	MESSAGE	
21			
ro New Sul	Mer	ibers	
ROM Comput	irw	orld	
DATE Today	TIN	8:00 A.M.	
		D O	
Important Subscribe Today!	1	Return Card	1
Answer Questions	1	Telephoned Save \$5 off basic rate	1
Answer Questions	1	0	10
MESSAGE Save m	They	get 51	
issues of C	only	Intelworld	
	2.95	*1	
0		,	
lame		Title	
Company			
Address			
Oliv		State Zip	
Please answer the questio			
BURNESS/MOUSTRY (Circle one) 10. Manufacturer (other than computer) 20. Finance/resurance/Real Estate		 Dir Algr. Sys. Development, Sys. Programming Management, Softe Developers Engineering, Scientific, R&D, Techto. Sys. Integrators/VARe/Consulting 	Architecture were
30. Medical/Law/Education 40. Wholesale/Retai/Trade		41. Engineering, Scientific, R&D, Tecl 60. Sys. Integrators/VARe/Consulting	h. Mgt. Mgt.
BullinezidareOuSTRV (Circle one) 10. Menufacturer (other than computer) 20. Financientsurance/financient 30. Medicalt_aw/Education 40. Wholesale/Retail/Tinde 50. Business Service (except DP) 0. Government - State/Federal/Local 65. Communications Systems/Public Util Transportation	Nico/	COMPORATE MANAGEMENT 11. President, Owner/Partner, General 12. Vice President, Asst. VP 13. Tressurer, Controller, Financial O	ni Mgr.
 Communicatoris Systems/Public Util Transportation Mining/Construction/Petroleum/Refin 80. Manufacturer of Computers. Comput Systems or Periphenia Systems or Periphenia Systems Integrations, VARs, Cumput Buresus, Soffwere Planning & Cons 	ing/Agric. ler-Floreted	13. Treasurer, Controller, Financial O	Moer
85. Systems integrators, VARs, Compute Bureaus, Software Planning & Const	er Service	DEPARTMENTAL MANAGEMENT 51. Sales & Midg. Management 70. Medical, Legal, Accounting Mgt.	
90. Computer/Peripheral Dealer/Dist,/ Re 95. Other	realist .	OTHER PROFESSIONAL MANAGEMER 80. Educator, Journalists, Librarians, 90. Other Tided Personnel	Students
2, TTLEPUNCTEN Loca one installed in		3. Are you involved in the purchase or u	ne of the
		Networking/Communication Equity PCs/Workstations Large Scale/Midrange Systems Software	

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306
POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-2144

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

URGENT	MESSAGE
TO New Subse	ribera
Para Lita	world
FROM Today	5100 A.M.
DATE TOTALY T	TIME B.OO A.M.
Important	✓ Return Card ✓
Subscribe Today!	✓ Telephoned ✓
Answer Questions	✓ Save \$5 off basic rate ✓
MESSAGE Save mis	an actisi
	0. + 0 0.1.
issues of com	- + 1
for only \$ 42.9	15 * 1
V 0	
Name	Title
T-Garrie	1000
Company	
Address	
7-120-120-1	
City	State Zip
Please answer the questions by	slow in order to qualify for this offer.
	elow in order to qualify for this offer.
	23. Dir Affgr. Sye. Development, Sye. Architecture 31. Programming Memagement, Software 41. Engineering, Goswiller, RAD, York, Mgr. CO. Sye. Transgellovar VARia Consulting Mgr. CO. See Control Transgellovar VARIa Consulting Mgr. 12. Vica President, Assa. Vig. General Mgr. 12. Vica President, Assa. Vig. General Mgr. 13. Transaux-Controller, Francial Ollicar Development Controller, Francial Ollicar Development Controller, Francial Ollicar Development Controller, Francial Ollicar Co. Michigal, Logist, According Mgr. Co. 71. Michigal, Logist, According Mgr.
#BusteschaldRNUETRY (Dicto one) #Personaline processing of the design of the	23. Dir Affgr. Sye. Development, Sye. Architecture 31. Programming Memagement, Software 41. Engineering, Goswiller, RAD, York, Mgr. CO. Sye. Transgellovar VARia Consulting Mgr. CO. See Control Transgellovar VARIa Consulting Mgr. 12. Vica President, Assa. Vig. General Mgr. 12. Vica President, Assa. Vig. General Mgr. 13. Transaux-Controller, Francial Ollicar Development Controller, Francial Ollicar Development Controller, Francial Ollicar Development Controller, Francial Ollicar Co. Michigal, Logist, According Mgr. Co. 71. Michigal, Logist, According Mgr.
** Business deather Prif** (Chica cost) ** Business deather Prif** (Chica cost) ** Business Service (Insert Chica) ** Communications Systems** Publication ** Computer Feather Computers** Comput	23. Dr. Adgr. Sye. Development, Sye. Architecture 31. Dr. Magr. Sye. Development, Schwarz 41. Engineering, Schwalle, Mad. Toch Mgr. COMPORATE MANAGEMENT 11. Francisch, Owner/Partice, General Mgr. 12. Toch Partice, Committee, Commit
** Business deather Prif** (Chica cost) ** Business deather Prif** (Chica cost) ** Business Service (Insert Chica) ** Communications Systems** Publication ** Computer Feather Computers** Comput	23. Dr. Adgr. Sye. Development, Sye. Architecture 31. Dr. Magr. Sye. Development, Schwarz 41. Engineering, Schwalle, Mad. Toch Mgr. COMPORATE MANAGEMENT 11. Francisch, Owner/Partice, General Mgr. 12. Toch Partice, Committee, Commit
** state-matched-waterTery (Cross over) ** state-matched-waterTery (Cross over) ** State-matched-waterTery (Cross over) ** State-matched-water ** State-matched-water ** State-matched-water ** State-matched-water ** State-matched-water ** State-matched-water-water-wat	23. Dr. Adgr. Sye. Development, Sye. Architecture 31. Dr. Magr. Sye. Development, Schwarz 41. Engineering, Schwalle, Mad. Toch Mgr. COMPORATE MANAGEMENT 11. Francisch, Owner/Partice, General Mgr. 12. Toch Partice, Committee, Commit
** state-matched-waterTery (Cross over) ** state-matched-waterTery (Cross over) ** State-matched-waterTery (Cross over) ** State-matched-water ** State-matched-water ** State-matched-water ** State-matched-water ** State-matched-water ** State-matched-water-water-wat	23. Dr. Adgr. Sye. Development, Sye. Architecture 31. Dr. Magr. Sye. Development, Schwarz 41. Engineering, Schwalle, Mad. Toch Mgr. COMPORATE MANAGEMENT 11. Francisch, Owner/Partice, General Mgr. 12. Toch Partice, Committee, Commit
**BusseschänkfeNUETRY (Dictio ore) **Terricopinus processor ore designation of the processor of the	23. Dr. Adgr. Sye. Development, Sye. Architecture 31. Dr. Magr. Sye. Development, Schwarz 41. Engineering, Schwalle, Mad. Toch Mgr. COMPORATE MANAGEMENT 11. Francisch, Owner/Partice, General Mgr. 12. Toch Partice, Committee, Commit



Idadalla Hallandla dalada dala

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

Workgroup Computing

HP REPLACES X TERMINALS, 53 MAP PRODUCTION STREAMLINED, 54

SQL Server users: Happy but hesitant

By Kim S. Nash REDMOND, WASH

Early users commended Microsoft Corp.'s SQL Server for Windows NT database but said that a single adequate product does not make client/server computing a viable scheme.

Initial pilots of NT and its accompanying database left several users saying they were basically happy. However, rollout of satisfactory test bed applications to the enterprise level depends on several factors, both within and beyond Microsoft's purview, users said.

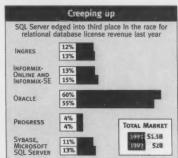
For example, compatible and affordable hardware is a sticking point for Chevron Canada Ltd. Windows NT "needs a pretty big chunk of hardware to perform," said Bill Soper, manager of information services. For pilots done so far, the oil company has run NT on 486-based machines with 32M bytes of RAM.

The Vancouver, British Columbia-based firm plans to move a 60-user order entry system used in its wholesale unit from IBM's OS/2 to Windows NT. However, the switch may be in a holding pattern until IBM certifies its Model 295 multiprocessing servers to run NT, which is expected by the first quarter of 1994.

For future NT-based systems, Soper is considering servers from Compaq Computer Corp. instead. Chevron plans to move several mainframe-based applications to NT—not Unix and not OS/2.

The company chose Windows NT because it wanted a foundation for client/server computing that is as vital to the vendor as it is to Chevron, Soper said.

"It's obvious that NT is Microsoft's key product moving forward. They can't afford to let this fail," he said. "So we'd be left behind if we didn't go [from OS/2] to NT."



Source: Montgomery Securities, San Francisco

For its part, Microsoft contends that SQL Server for OS/2 is in no danger. "The product will keep pace [technologically] with the NT version," said Gary Voth, SQL Server product manager.

NT's sheer newness put off other Microsoft

users. "Iwould never start with a new Microsoft product. They're notorious for putting out buggy systems," said Howard Roth, head of information systems at Gymboree Corp., a children's clothier in Burlingame, Calif.

Roth cited early and ongoing problems with Windows 3.1, such as unexplained error messages and system crashes. Gymboree runs Sybase. Inc.'s Unix version of SOL Server.

Patiently waiting

On the other hand, Goodwin's & Sons plans to bet the business on NT—but not yet. The grocery chain awaits results of a carefully contained, 10-user pilot at its flagship store in Crestline, Calif., owner Martin Goodwin said.

Goodwin and a Microsoft-recommended third-party consultant built an integrated sales and accounting system using Microsoft's Access and Visual Basic. Neither of Goodwin's existing point-of-sale (POS) system suppliers — IBM and NCR Corp. — offered such an integrated application. Because Goodwin's already used several Microsoft products, including Visual Basic, Word and Excel, the company opted to continue down the Microsoft lane by buying NT and SQL Server, Goodwin said.

The NT-based system collects data from checkout stands, such as fast-selling items and the ratio of cash to check to credit-card sales, and integrates that information with the

SQL Server, page 53

On the agenda

Chevron Canada

plans to move several mainframe applications and one OS/2based system to Windows NT. It will start with a 60-user order
entry application when
IBM certifies Model
295 superservers for
Microsoft's NT operating system, which IBM
promised for firstquarter 1994.

Goodwin's & Sons

is testing an NT-based POS system at a 10user flagship store. The homegrown NT application will replace an IBM and NCR POS setup that lacked integration with the grocer's accounting software. Checkout stands are equipped with 486-based 66-MHz PC s.

EIS vendors adopt SQL to push client/server

By Michael Vizard

■ Four major suppliers of executive information systems (EIS) are adding SQL interfaces to their offerings as part of a drive to accelerate the replacement of mainframe-based EISs with client/server software.

Vendors adding support for SQL include Pilot Software, Inc. in Boston, Information Resources, Inc. in Waltham, Mass., Planning Sciences, Inc. in Littleton, Colo., and Comshare, Inc. in Ann Arbor, Mich.

According to International Data Corp. in Framingham, Mass., Comshare has a 50% share of the EIS market, compared with 15% for Pilot and 10% for Information Resources.

The addition of SQL interfaces to these products is intended to give users the ability to directly browse and read data stored in a SQL database, as opposed to requiring database administrators to replicate data into a separate database that must be maintained and updated.

"Right now we do a lot of extracts and downloads of data into spreadsheet files and text files. In the future, we'd like to be able to let people go directly against the data locked in the SQL databases," said John Doucette, vice president of information systems at Bay State Gas Co. in Westboro, Mass.

In the short term, Bay State Gas will probably use the SQL interface to give users read access to data stored on its mainframes from within Pilot's Light-Ship offering. But over time, Doucette said, he expects that Bay State Gas will be able to eliminate its need for a mainframe altogether.

More than one option

Pilot has two products with SQL front ends. One is its traditional Command Center Plus mainframe-based system, which runs on IBM mainframes and Unix systems from IBM and Hewlett-Packard Co. The second offering is the LightShip series, which includes a set of analysis tools for Windows systems that are linked to the LightShip server database.

Users can apply the Windows tools against data downloaded to the Light-Ship server or use the tools directly against data stored in as many as 20 SQL

databases using either native drivers from Pilot or drivers from Q+E Software, Inc. in Carv. N.C.

Meanwhile, Comshare is also moving to improve SQL access by adding support for 21 SQL drivers. To do so, Comshare is using software from Q+E Software in its Commander EIS

Commander EIS product line.
Unlike Pilot, the

Unlike Pilot, the Comshare client/ server product is based essentially on the same code base as the company's mainframe software.

Comshare has also added an implementation of its multidimensional spreadsheet module to its EIS, aimed at profit and loss analysis.

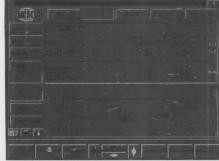
Similarly, Information Resources has added SQL support to

its EIS package in addition to support for Windows, Windows NT and Open Software Foundation Motif clients. However, the SQL interface from Information Resources supports only the SQL Server database from Sybase, Inc. and Microsoft Corp., and that interface will not be available until the fourth quarter.

Meanwhile, Planning Sciences e

pects to add support for SQL drivers from Q+E this October.

Gentium, a new EIS offering from Planning Sciences due out in November, will use object technology to allow users to reformat data without the aid of information systems professionals, according to

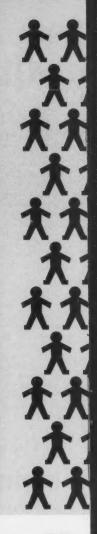


 $\textbf{Comshare's Commander} \ uses \ software \ from \ Q+E \ Software$

Bill Hopkins, vice president of marketing at Planning Sciences.

Gentium is based on an object file system that allows the company to add data access modules by encapsulating them into an object that is then linked to the Gentium database. Users can then define data as a set of objects that can be easily shared with other Gentium users.

See Your Customers As Individuals, And You Could See A 15% Increase In Revenues.



No One Offers Better Ways To

You can never know too much about your customers. And with conventional mainframe

systems you won't. Only ART/NCR can give you the processing power to extract individual customer profiles from the detail data that already exists in your enterprise. And the servers and networking power to move that information wherever it's needed.

66 The ability to manipulate large databases, analyze data, and get information out quickly to the people who need it gives us a number of advantages. We gain better insight on how to manage the Railroad, save money because we are better able to deploy assets, and ultimately improve customer service. 39

Joyce Wrenn, Chief Information Officer, Union Pacific Railroad BETTER KNOWLEDGE OF YOUR CUSTOMERS CAN MEAN A BETTER BOTTOM LINE.

We can help you understand not only who your customers are and what they are doing, but what they're most likely to do *next*. So you can create specific marketing programs for each customer segment. Better sell and service existing customers. And develop new ones.

That can mean higher customer satisfaction and a better bottom line. In fact, our customers report revenue increases of as much as 15%.



New Levels Of Power From A New Kind Of Information Company.

No other company in the world offers so many solutions for capturing data and turning it into

actionable information. From mobile PCs, through the world's broadest, most powerful family of midrange servers, to massively-parallel processors.

And no other company can match our global expertise in communications and networking. Once the information is generated, we can help you move it anywhere in the world, fast.

To get to know your customers better, phone 1 800 CALL-NCR today. We can help you implement the breakthrough applications that will help you thrive in the future.



An AT&T Company

NCR is the name and mark of NCR Corporation. ABET and the ABET globe design are registered service marks and trademarks of American Releptione and Relegraph Company, intel and the Intel Involte Lugo are registered trademarks of Intel Corporation. © 1993 NCR Corporation.



Stop throwing programmers at the maintenance backlog.

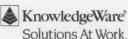
LEGACY WORKBENCH

There's an easier way to tackle your company's maintenance backlog, while improving the quality of unwieldy and over-modified legacy systems. With Legacy Workbench™ and Flashpoint, two key elements of the complete redevelopment solution provided by KnowledgeWare.

Start with the Legacy Workbench, a comprehensive suite of tools to help you accelerate maintenance and reduce the cost of supporting existing systems. With powerful tools like graphical maintenance, application assessment, program documentation, and program restructuring, the Legacy Workbench streamlines spaghetti code and brings breakthrough efficiency to your legacy workhorses. With Legacy Workbench, you'll dramatically reduce your applications' maintenance requirements. So you can protect your company's investment in COBOL, improve the productivity of your maintenance staff, and have the flexibility to reassign maintenance resources.

FLASHPOINT

Now you're ready for Flashpoint, KnowledgeWare's design and development tool. With Flashpoint, you can make your move to client/server technology without disrupting essential host applications. It helps you reduce development time of GUI front-ends by up to 90%, offload host processing, and implement interface standards across your organization. Windows "-based Flashpoint seamlessly integrates new and old applications residing on host, LAN or PC platforms. Desktop users can cut- and-paste information from any spreadsheet, database or other favorite application. So if you look at your maintenance backlog and see a problem, look to KnowledgeWare for solutions. Call today to find out how KnowledgeWare can help you with products and professional services that give you the edge.



VH	I want to learn how KnowledgeWare can help
162:	me tackle my company's maintenance backlog.

ALTERNATION AND DEPOSIT

Phone: () ______ FAX: () _____

Mail or FAX this card to **1-404-365-0246**. For even faster delivery, call **1-800-338-4130**.

CW-09





No Postage Necessary If Mailed In The United States.

BUSINESS REPLY MAIL FIRST CLASS MAIL PERMIT NO 15528 ATLANTA GA

POSTAGE WILL BE PAID BY ADDRESSEE

Legacy Workbench[™]/
Flashpoint® Information
KnowledgeWare Inc.
3340 Peachtree Road, NE
Atlanta, Georgia 30326-9826



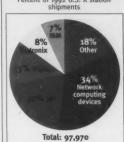
HP replaces X terminal line

By Jean S. Bozman CHELMSFORD, MASS

Hewlett-Packard Co. last week announced that it is replacing its entire 4-year-old line of X Window System terminals with a multimedia-capable line called Envizex.

The move, which analvsts said is intended to boost HP's 20% market share, was accompanied by the announcement of two 75-MHz HP 9000 Model 700 Unix workstations and two 100-MHz Unix workstations for industrial applications. HP, which is second to Network Computing Devices, Inc. in Mountain View, Calif., in global X terminal shipments, is already ahead of Unix workstation rivals IBM and Sun

Market divisions Percent of 1992 U.S. X station shipments



Microsystems, Inc. (see chart)

Now HP plans to convince information systems managers that they can reduce the cost of Unix computing by buying X terminals and workstations in a volume package deal, analysts said.

"They're moving to provide all of the user interface facilities that you get with

a workstation at the X terminal level." explained Andrew Allison, an independent consultant based in Carmel. Calif.

Eileen O'Brien. an analyst at International Data Corp. Framingham, said HP shipped 193,000 X terminals last year but will ship nearly 300,000 in 1993.

The Envizex X terminals will range from \$1.995 for a

14-in, color terminal to \$5,595 for a highperformance 19-in, color unit. They support shared whiteboard, audio and scanning features, and they can be linked to X servers from IBM, HP, Sun and The Santa Cruz Operation.

New editions

At the same time, HP is adding 75-MHz versions of the HP 9000 Model 700, Model 715 and Model 725 workstations, as well as two 100-MHz Unix workstations for industrial uses, the Model 745I and Model

The Model 715/75 is priced at \$15,395 for an entry-level configuration with 32M bytes of memory and a 525M-byte disk drive. The entry-level Model 725/75 is priced from \$18,395, HP said.

The industrial Models 745I and 747I are priced at \$22,890 and \$26,490, respectively. Upgrades from installed 33-MHz Model 715 units to the 75-MHz version will cost users \$10,500, while upgrades from the 50-MHz Model 715 or Model 725 to the 75-MHz version are priced at \$6,500.

Groupware initiatives differ widely in style

By Michael Vizard

As the groupware phenomenon continues to evolve, the different tacks vendors are taking to address the growing demand for collaborative computing are beginning to emerge.

The dominant offering in this sector continues to be Notes from Lotus Development Corp. But Borland International, Inc. is promoting its recently unveiled Object Exchange (Obex) technology [CW, Sept. 20].

Notes allows Windows and Macintosh clients to access applications and documents stored in an object database running on OS/2, Unix or Windows servers.

Notes is generally recognized by users as particularly good at providing a foundation for the bidirectional communications needed to create interactive dis-

cussions. Lotus extends this metaphor to include tools for building tracking and process-oriented applications.

Open access to data

In contrast, Borland's Obex allows any application to share data by posting it in a separate object store that users can then subscribe to over any electronicmail or network protocol. Essentially, Obex provides an application-independent mechanism for storing data that can then be inserted into other applica-

As such, it provides an unstructured method for dealing with data that is typically stored in structured documents such as databases and spreadsheets. In contrast, Notes provides a structured environment for documents that typically consist of unstructured data.

In general, Borland concedes that Notes is a good environment for electronic discussions but maintains that Obex is more useful for letting applications share data more cost-effectively. This is because Obex does not require users to adopt a specific database running on a server, as Notes does.

Lotus, however, stresses that the move to document-centric computing requires an object database that provides system services to manage and track access to documents

OLE added

Meanwhile, Microsoft Corp. has said it is retooling Windows with a document-oriented interface and is adding system services - starting with its Object Linking and Embedding (OLE) interface — that were designed to ease data sharing and document tracking.

However, OLE currently works only on individual Windows systems. A networkaware version of OLE is not expected until the arrival of Microsoft's Cairo objectoriented operating system in 1995.

SQL Server users: Happy but hesitant

CONTINUED FROM PAGE 49

grocery chain's inventory and bookkeeping systems. The application can store up to two years' worth of data. The existing POS program kept just 13 weeks of material on-line.

'We can poll our records by many different variables, which helps us make smarter inventory decisions," Goodwin

Also attached to the system is a penbased NCR UltraVersa portable computer. Managers stroll up and down store

aisles with the UltraVersa, noting prices and checking bar codes. The machine can talk directly to a 486-based server over a wireless network.

Overall, NT and SQL Server for NT beta sites appreciated the help Microsoft gave them to create applications for the new products. But they said they plan to put those systems into production slowly, taking precautions. For example, King County Medical Blue Shield is running SQL Server for Windows NT only with ap-

To market, to market

To recoup a \$170,000 outlay to build a Windows NT-based inventory/accounting system, Goodwin's & Sons plans to sell the program to other grocery chains. A 38-store New Zealand supermarket chain recently agreed to buy the product.

plications that are simultaneously running on an IBM AS/400 minicomputer.

'This is the product's first release, so I'm not going to be blind and think nothing's going to happen," said Sean Dittmore, beta manager at the Seattle-based health maintenance organization.



Geological Survey speeds up map production

By Gary H. Anthes

The magic is in the digital orthophotos.

These are not computerized dental X-rays; they are a technological break-through in the way maps are made.

Work at the U.S. Geological Survey (USGS) is a little like the labors of Sisy-

phus, the mythical Greek figure condemned for all time to push a huge rock up a hill in Hades only to have it come rolling down again as it nears the top.

It took the USGS four decades to map the U.S. into 55,000 topographic quadrangles, each seven miles by nine miles on a side. As it takes years more to revise a map, most are out of date before they are printed.

But now, thanks to powerful workstations, geographic information systems (GIS) and digital orthophotos, the time needed to revise a map can be reduced by a factor of 10, while the resulting maps are retained in computer databases as well as on paper.

USGS is updating its old maps by scanning them from film and digitizing them, editing and annotating the resulting vector images with GIS-maniputable tags and codes and then overlaying them with recent aerial photographs fit precisely to the original map images by a mathematical process called "ortho-rectification."

Aerial photographs are scanned in and their digital images are precisely adjusted, pixel by pixel, for displacements

caused by camera angle and terrain variations. Cartographers then sit at workstations and add, change and delete features in the map images based on what they see in the superimposed photo layer.

For example, cartographers can sketch in new roads, add houses, enlarge shopping centers or change forest boundaries with a mouse and a little help from the Arc/Info GIS package from Environmental Systems Research Institute, Inc. in Redlands, Calif.

Computing power to execute the equations needed to manipulate all those pixels was available only from mainframes, and that kept the process from being cost-effective, said Ernest B. Brunson, chief of the

research, technology and applications branch at the Mapping Application Center.

Now, 200 cartographers at three locations on LANs do the job with Data General Corp.'s Aviion 530 workstations, Motorola, Inc.'s 88100 processors and 3G bytes of disk storage.

According to Eric Anderson, chief of the Mapping Application Center, it now takes a

cartographer four to six weeks to update a map using the digitized map images and the computer-adjusted photographs instead of up to 18 months to do the work with paper maps and photographs.

However the method still has limitations, Anderson said. For example, ortho-rectification "flattens" the photograph so that it cannot be used to update map contours, which would be necessary to show how a new road cut through a mountain.

To do that, USGS employs stereoscopic pairs of aerial photographs that are superimposed over the digitized version of the old map. A cartographer wearing Polaroid glasses sees the terrain in three dimensions through a special Polarized

A cartographer at the U.S. Geological Survey updates a map using a GIS and digitized aerial photographs

screen—which gives him the impression of peering out of a hole in the bottom of an airplane— and he is able to adjust map contours accordingly using the Are/info software.

The new map update technology unfolding at USGS is really part of a two-pronged effort, with the first objective being to turn existing maps into computer-processable images tagged with identifiers for features such as roads, utility lines, rivers and buildings. That effort is about 10% complete, and the USGS hopes to have the entire database built by the year 2000, Anderson said.

Anderson said it costs the USGS about \$10,000 to digitize and code each of the 88,5000 topographic maps.

Data General mulls Aviion microprocessor options

U.S. Geological

Survey

Reston, Va

line a manual process for

updating 88,500 topo

Solution: GIS software, powerful workstations

and computer-manipu

Result: The most labor

intensive process was

accelerated by a factor

lated aerial photos

graphic maps.

Challenge: To stream

By Craig Stedman

With Motorola, Inc.'s 88000 RISC microprocessor facing an uncertain future, Data General Corp. has started doing test ports of its DG/UX Unix System V Release 4 derivative to other microprocessors. The company is trying to clear the path for a possible switch away from the 88000 as the engine for its Avion servers in the future.

Stephen Gardner, DG vice president of Aviion marketing, would not specify which microprocessors are in line for test ports of the operating system. However, Gardner noted that DG is interested in "the most commodity-oriented ones," a category he said includes Intel Corp.'s Pentium and the IBM/Motorola PowerPC.

DG previously had said it remained staunchly behind the 88000, despite being one of just a handful of computer makers still using that chip as Motorola shifts its emphasis to PowerPC. Gardner reiterated that an immediate change is not in the offing but said DG is doing more involved "technology explorations" with other hardware architectures than it had previously.

"Sure, our level of activity has stepped

up," he said. "But I think that's a logical thing to do given the new chip developments in the last 12 months. It's more driven by that than by concerns about the [88000]."

David Card, a Unix analyst at International Data Corp., a Framingham, Mass., market research firm, noted that even Motorola's own computer group has started telling users about plans for switching to PowerPC. "I think DG will have to make a statement fairly soon" on its migration plans, perhaps in the next six to 12 months, Card added.

DG expects to continue using the 88000 for "at least three or four years" and foresees both clock speed improvements and larger systems than the 16-processor AV 9500 scheduled to ship next spring, Gardner indicated. "There's no imperative for us to do anything" about the microprocessor, he said.

Gardner added, however, that the company's "crystal ball is subject to change." The test ports to the other architectures are intended in part to give DG "credibility with customers, to let them know that we're not deaf, dumb and blind" to the changes in the microprocessor market, he noted.

Rival vendors are using the uncertain-

ty over the 88000 as a competitive weapon, and customers do bring the matter up, Gardner said. However, he described it as "a noise-level issue" given the portability of DG/UX, and several Aviion users agreed.

"From where I sit, it's no big deal," said Mitchell Stevelman, vice president of MIS at High Yield Management Securities, Inc., a brokerage firm in Clifton, N.J. For now, the 88000 provides better multiprocessor scaling than other architectures and more than enough raw performance, he added.

Stevelman is having no problem finding application software written to the 88000 and said he has been promised by DG that any switch to a new microprocessor will involve no more than a board swap and a DG/UX upgrade. "I expect it to be cake," he said.

Richard Duke, director of data services at St. Patrick Hospital in Missoula, Mont., also said he is unconcerned. "With their view of open architectures, we'll be able to make the jump," he said, adding that the portable nature of DG/UX was one of the main reasons the hospital bought Aviion machines.

Only about 7% of DG/UX's kernel code is hardware-dependent and would need to be changed to support another micro-processor, Gardner noted. He said DG does not want to settle on a new chip now "because today there's not one choice that looks like an obvious winner" in terms of microprocessor market share.

Briefs

System 3525 benchmarks

NCR Corp. announced benchmarking results for its System 3525 based on the Transaction Processing Performance Council's TPC-C benchmark. The NCR 3525, which was tested with two Intel Corp. Pentium processors running Informix Software, Inc.'s Online Database Server with NCR's Top End transaction processing monitor, performed at 666 transactions per minute (TPM-C) at a cost of \$1,399 per TPM-C.

SHL, the ASK reseller

SHL Systemhouse, Inc. has agreed to resell database engines and development tools from The ASK Group, Inc. The deal is part of ASK's stepped-up campaign to sell more products through systems integrators.

Oracle adds to Financials

Oracle Corp. plans to add Datalogix International, Inc.'s Enterprise Manufacturing Management System to its Financials line. The Unix-based client/server manufacturing planning applications target process manufacturers. Lewlett-Packard's client/server solution helps Chesebrough-Pond's listen to customers more closely. This gives their marketing a fresh new complexion.

> "Not only did HP work hard, but they were willing to team up with us. It became a true alliance, a true partnership."

Gene Goodmaster, Director of Management Information Chesebrough-Pond's USA

Every year, 200,000 phone calls pour into the Consumer Information Center at Chesebrough-Pond's USA.

And the number is growing 18% annually. By listening closely to each caller, they resolve customers' problems. And collect valuable marketing data.

To achieve a new level of service, they called us. Our answer was an HP client/server solution—an HP 9000 Business Server linked to thirty-two HP X stations, installed according to plan by HP's Professional Services Organization.

This Open Systems approach lets Chesebrough-Pond's reps respond immediately. It not only has the power to handle the increased volume fast and accurately. It also links into companywide information systems to make the data instantly available.

To find out more, call 1-800-637-7740, Ext. 7701. It could make your company's future look even rosier than you think.

Think again.



©1993 Hewlett-Packard Company GSY9311

MOVE FROM WORDPERFECT TO AMI PRO WITHOUT EVER TOUCHING A MANUAL OR A CHECKBOOK.

INTRODUCING SMARTMOVE— GET AMI PRO FOR WINDOWS FREE FOR 25% OF YOUR CURRENT DOS WORD PROCESSING USERS.



If you're considering the move to Windows™ word processing, you should know that software experts and critics from all over are talking about Lotus® Ami Pro® 3.01 for Windows part of the award-

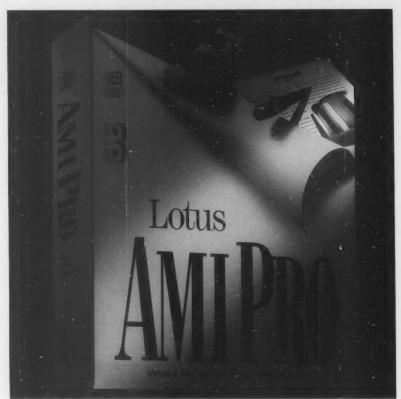
winning suite of Lotus Windows applications. The consensus is that no word processor makes the move easier or more rewarding, Period. In fact. according to PC World (3/93). 'Users moving from DOS can fearlessly choose the latest Ami Pro version.'

That's a strong claim. But we're so confident you'll agree, we're making an equally strong offer. If you qualify, we will give you Ami Pro software free for 25% of your installed DOS word processing base.*

No wonder we call this offer 'SmartMove'. (See below for qualifications.)

NOTHING MAKES THE MOVE TO WINDOWS WORD PROCESSING EASIER THAN AMI PRO.

If you're working in WordPerfect* for DOS now. you're in for a surprise when you switch to Windows: WordPerfect for Windows actually requires you to learn new keystrokes. In fact, Ami Pro is easier – easier to transition to, easier to learn, easier to work with – than anything else. Ami Pro gives you seamless conversion of all your DOS word processing files (including a one-step batch conversion process). The WordPerfect SwitchKit shows you how to perform a function in Ami Pro when you type in WordPerfect DOS commands. And the OuickStart on-line tutorial makes learning quick and



easy. All of which means that Ami Pro gets you up to speed fast – so fast that Forbes Magazine (2/1/93) reports. "You can learn to use Ami Pro... in about a day. Put the manual in a drawer as the first step."

> SMARTMOVE GIVES YOU THE BEST WINDOWS WORD PROCESSOR AT THE BEST PRICE EVER - \$0.

Right now you can get the Windows word processor all the critics are raving about at a low, low cost of zero dollars. Just call 1-800-831-9679* to see how you qualify to get Ami Pro free while supplies last. You'll also receive a white paper detailing how and why other companies made the switch to Ami Pro 3.01. Yes, it's an incredible deal, but don't worry – once you try Ami Pro, we know you'll be back for more.



*A maximum of 50 copies of Ami Pro will be provided to each participant. Copies provided to each agency, division, group, subsidiary or other affiliate of a participant will be aggregated for the purpose of this limitation. Supplies are limited. Qualificactions: 1. The dividication is middle or entity wishing to participate in this program Practicipant of must currently own at least ten units of any stand-alone DOS or Windows word processor installed in the location where Ami Pro is to take its middle of any stand-alone DOS or Windows word processor; installed in the location where Ami Pro is to take its middle of the program within the processor of the program of the prog

BUILDING KNOWLEDGE

hat none of us realized in 1990 was that Jack Welch was guilty not of exaggeration but of understatement. It is not just the pace of change that is different, but the magnitude of the change. Success today depends on a company's ability to anticipate change, reduce product life change in cycles, adjust to changing gov-

66The

pace of

the nineties

the eighties

will make

look like

a picnic,

a walk in

Jack Welch

the park. 99

Chairman and CEO

General Electric

March 26, 1990

of the globe, and transform ever increasing amounts of data into information that can be acted upon. It also depends on the ability of

ernment regulations, compete

with companies in every corner

employees to learn to work in new and different ways. Today,

businesses are downsizing and right-sizing, creating strategic alli-

ances, and empowering their employees. They are tackling issues such as customer satisfaction and quality; they are reengineering their business processes; and they are striving to become more flexible by creating open learning organizations. The tool making all of this possible is technology.

The Great Enabler

Information technology speeds manufacturing and improves back office operations. Furthermore, the ability to tap

into the vast amounts of information available provides that allimportant competitive edge. For example, when a company shares information across the organization, lavers of management can be eliminated. flattening the organizational structure. These flattened organizations can makeand implement-decisions quickly. Moreover, sharing information with customers and suppliers helps break down the

organizational boundaries. When people share knowledge and work together, teamwork is enhanced, and when employees are empowered to deal directly with their customers. quality of service improves cementing relationships with customers.

Technology

also provides information and tools that reduce costs and increase profit margins. It enables the reorganization, or reengineering, of business processes and functions. Moreover, technology eases the development of strategic alliances, whereby companies and their suppliers form long-term relationships, or companies join together to provide a wider range of services than any one of them can provide

But it is critical to remember

on its own.

that technology is not magic; it is a means of transferring and sharing information in an organiza-After all, information shared, analyzed and acted upon is what provides the competitive advantage organizations need. The tools an organization employs for the management of technology, for bringing the right information to the right people, will determine whether or not information makes the order of magnitude difference organizations are seeking.



End users need easy access to information, often in real time, to use it effectively. For example, a food and beverage company in the Midwest connected its information systems to its manufacturing systems to gain control of the flow of beer through its valves in response to information about sales, maximizing production capacity. A major clothing retailer restocks individual stores overnight because it can now transmit information gathered in a point-of-sale inventory control system to the central warehouse ordering system at the close of every business day, ensuring the availability of products in greatest demand.

Achieving these results is not simple. The development of information systems that fit organizational needs and can adapt to changes in the organization is a crucial issue. Selecting and implementing the right technology for the organization takes a thorough understanding of the nature of the business, its organi-



"It is not just the pace of change that is different, but the magnitude..."

A THOUGHT LEADERSHIP SERIES PREPARED BY PRICE WATERHOUSE

zational structure, its culture and the way management works. That is why those who assist organizations to choose their technological direction must look at the organization holistically. Optimizing functions and streamlining processes—reengineering—requires a thorough understanding of the processes, functions and technology in place.

For example, a top ten manufacturing company was able to reduce its performance measurements from 2000 individual measurements to 60 across the company through technology. A test-

information in an organization is not in the existing systems. Rather it is in the minds of employees. This information must be captured and incorporated into the organizational knowledge base.

Enhancing Knowledge

Capturing an organization's information and making it accessible to users across the company requires an investment of time and money. Not only must the right systems be put in place and the right applications chosen for accessing the information, but the organization's employees must learn to understand and use these new tools. The issues involved in providing the right technology are complex and often politically charged. For example, in today's new organizations information has to be closer to the individual user. This often means that central IT organizations are no longer the clearinghouse for all information systems, but rather provide guidance and standards while the line organizations or individual business units own the systems. In this computing environment, companies need help with issues of security and data integrity, they need help with the development of special applications that allow them to interface with their alliance partners, and they need tools that enable them to respond to customers in real time with critical information.

For example, to remain competitive a major bank needed executive support systems that facilitated portfolio management, a car designer needed a new design center that could speed delivery of new designs, and an aerospace company needed product data management. These tools could be developed for them because accumulated knowledge and experience across industries in numerous companies was available to ensure that all the latest developments in technology would be considered in choosing the right tools. The collective wisdom gained through the sharing of information makes a differenceand today that wisdom must be available in real time because of the speed of change.



Success today depends on transforming "data into information that can be acted upon." ing facility that thought it needed additional storage area to collect enough batches of specific products for future testing developed ways to optimize the testing process so that individual testing was cost effective, eliminating the need for storage. A company that custom builds homes can now present clients with screen images of the different possible configurations of rooms to choose from, eliminating the need for multiple individual blueprints, thus providing them with a competitive edge. One of Europe's largest banks now uses a parallel processing system to deliver the management information needed to service accounts within minutes, thus meeting its customers growing needs for sophisticated financial services

These benefits are realized only when technology is used to maximize existing information to its fullest. But it is important to keep in mind that much of the

CASE STUDY:

Price Waterhouse, a world-wide network of member firms, is one of the largest providers of professional services in the world, employing over 45,000 people. Long known as the premiere accounting/consulting firm, they conducted extensive client research and undertook a massive strategic planning effort in the late 1980s to solidify their competitive position in the coming decade.

Analyzing the many challenges that confronted those in their industry, they recognized valuable time was lost identifying the best people, based on prior experience and expertise, to staff client assignments; they knew how difficult it was to provide specific expertise about an evolving technology when they first had to locate that individual at Price Waterhouse; and they knew their clients would benefit tremendously if Price Waterhouse consultants working on an assignment in London could work in real time with people on the same assignment in New York.

Most of all, they realized their clients would be provided with added value, and their leadership position would be solidified, if they could find a way to give their clients access to the entire body of knowledge and experience of the firm while their competitors were providing advice based only on the experience of the people working on the assignment. After all, the principal product of a service firm is knowledge. Consultants provide advice to their clients; the greater the experience and expertise and the more timely the information, the more value they provide. The problem is that, in a world marked by constant change and an abundance of information, capturing and building on the expertise of such a large group of highly mo-

Price Waterhouse - Knowledge Fully Shared Solidifies Leadership Position

bile people presents an enormous challenge.

Price Waterhouse's leadership decided that to better serve their clients in the future, they had no choice but to collect the wisdom and experience that resided in the minds of their people and make it available to every member of the organization. They began by looking at the problem holistically. First, they analyzed their own organization to better understand the nature of the problem they faced:

ey

ed

aff

de

V-

rst

at

re-

ise

gn-

me

eir

ith

nin

if

eir

dy

of

ors

nly

ple

of a

on-

eir

eri-

ore

ore

by

ing

• The enormous size of the organization (over 45,000 people) and the number of locations across the world (400 offices and 100 countries).

• The fact that as consultants, their professionals spend a great deal of time traveling and work-

ing at client sites.

• Their constant need for information—on various industries, regulations, economic and demographic factors, and technological developments—that becomes obsolete almost as soon as it is available.

 The necessity of assembling teams from many geographical areas to work on specific projects in many different locations.

 The importance of providing both staff and clients with information about technological developments from external sources on a need-to-know basis.

• The fact that Price Waterhouse has its own R&D laboratories (Technology Centre and Advanced Software Engineering Centers) that both needs information and has highly technical information to convey to those working on projects.

• The need to document information so that, for example, when a project is completed or an individual leaves the firm, the information gained is not lost.

Price Waterhouse turned to

technology for an answer. After a great deal of experimentation, it built a proprietary system that allowed it to collect and analyze data, to store information, to access outside information sources, and to tie together the whole global organization. Furthermore, Price Waterhouse did not limit its use, but is sharing information with strategic alliances and suppliers as well as clients. It also spent a great deal of time changing the culture of the organization, instilling an appreciation of the value of flexibility and open communication in all those who are a part of the organization. Today, all Price Waterhouse staff are linked together on a network that provides vast amounts of information in real time, a network that allows staff members to work together though far apart, a network that captures all the information generated in the course of an engagement to provide a base for those involved in the next project to build on.

Today, a Price Waterhouse partner in Paris, one in Argentina, and one in California can work on an assignment together, without wasting valuable time and money traveling to the same location: the teamwork encouraged by this interactive system provides the enhanced productivity once achieved by physical proximity. Today, a Price Waterhouse partner can find someone with specific experience in a new technology for a project in hours by searching a data base of all employees; time wasted making numerous phone calls has been eliminated. Today, all Price Waterhouse people can remain on the leading edge by sharing research findings on a real time basis from their technology labs around the world; they no longer have to do the research themselves. Today, an institutional

memory exists, allowing Price Waterhouse professionals to examine previous engagements and learn by their findings; they no longer have to reinvent the wheel. Today, Price Waterhouse tax partners in all fifty states can provide clients with information overnight about the effects of a change from a tax law passed yesterday; copies of the legislation can be scanned into the system immediately upon passage, a note can be sent out announcing a conference call to discuss it a few hours later, and the collective opinion of the Price Waterhouse experts can be sent out on the system in hours. Today, a team of Price Waterhouse consultants out on assignment can call into the network through their laptops and access all the resources they would have available if they were in their own offices; they can request information and materials, access presentations on technical or business issues, and set up new travel plans from their homes and hotel rooms, responding to changing client needs. Today, a Price Waterhouse partner can tap the entire firm for information in response to a client's question and provide an answer based on knowledge fully shared-the world is at their fin-

Price Waterhouse has successfully entered the age of information through the use of advanced technology, and is well positioned to help its clients do the same. In order to learn how Price Waterhouse can draw on its own experience to help you reach your full potential through information technology write: James Rafferty, Price Waterhouse, Management Consulting Services, 1251 Avenue of the Americas, New York, NY 10020 or call (212) 819-5000.

Price Waterhouse gives clients "access to the entire body of knowledge and experience of the firm." Their competitors provide "advice based only on the experience of the people working on the assignment."

WHEN WILL YOU SEE A RETURN ON YOUR RE-ENGINEERING EFFORT?



NOBODY ACCELERATES THE PROCESS FASTER THAN ORACLE.

Oracle is the only company in the world that applies leading-edge database technology, development tools, applications and consulting services to your specific business problem. We deliver enterprise-wide information systems *fast*. On <u>any</u> hardware or operating system you choose. At \$1.5 billion, operating in 100 countries, Oracle stands ready to serve. If your company's lack of agility is a source of frustration, take a minute to call 1-800-633-1071 Ext. 8119 for a copy of The <u>Oracle Perspective</u> on re-engineering.

ORACLE

©1993 Oracle Corp

Start-up to market Windows NT server with Microsoft

By Jean S. Bozman SUNNYVALE, CALIF

Netpower, Inc., a start-up funded by Silicon Graphics, Inc. (SGI), Stanford University and venture capitalists, is scheduled to announce today that it is shipping a Microsoft Corp. Windows NT server based on RISC chips.

The Netpower server family is one of the first groups of machines to support Windows NT applications in direct competition with RISC-based Unix workstations and servers, the company said. The ervers are built with RISC chips provided by SGI subsidiary Mips Technologies,

Netpower will jointly market client and server versions of the computer with Microsoft, said Linda Hargrove, Netpower vice president of marketing. Microsoft has been involved with a precursor to the Netpower machine for some time, Hargrove said.

Microsoft was one of 20 beta sites for the server, she said. Others include Fidelity Investments in Boston and Nordstrom, Inc.'s department store chain in Seattle, Hargrove noted. Now, 9-monthold Netpower will join with Microsoft in regional sales events, she said.

Marketing will initially be aimed at users in the Windows NT software development community and in the computeraided design market, said technology analyst Jeffry Canin at Salomon Brothers, Inc. in San Francisco.

Over time, the small firm can expect competition from two sides: Intel Corp.based PCs, especially Pentium models, and Unix workstations, Canin said. However, Netpower's small size - reportedly less than 100 staffers — will allow for a PC business model that depends more on retail and channel sales than on direct

Runs 32-bit applications

At the heart of the Netpower machine is a Mips R4400 RISC chip operating at either 50 MHz, 67 MHz or 75 MHz. It is a chip with a 64-bit internal address space that runs 32-bit applications, said Ed Frank, vice president of research and development, who helped design Sun Microsystems Inc.'s SPARCstation 10 Unix workstation. Prices range from \$4,995 for the desktop Model 100 to \$17,000 for the highend Model 300 server; all models will ship immediately.

Frank claimed the price/performance of the Netpower NT system is better than many midrange Unix workstations, performing as well or faster at a lower price.

Interoperability with Unix applications will play a key role in the Netpower strategy. "We're working to be able to use our machines as X Window servers to a Unix application," Frank said, so that users can have both NT and Unix software

The next generation of Netpower servers will also support Sun's Network File System, allowing the NT and Unix servers to exchange files, he said. The machines will also run on TCP/IP open systems networks and can act as clients to a Novell, Inc. NetWare server.

Netpower's entry in the NT market will complement SGI's Unix strategy, said C. Robert Miller, chief executive officer of Netpower. "SGI thinks it's very important for the Mips [chip] architecture to succeed in the NT space," said Miller, who was CEO at Mips Computer Systems, Inc. when it was acquired by SGI. "From their perspective, it's a totally different business model [than the one] they're operating with today, where they're using Unix to address the high-end scientific market.

Miller did not disclose the size of Netpower or project its revenue for the coming year.



TECSYS ELITE" SERIES

The Leading Open Systems Software for Distribution & Manufacturing

The Distribution Series

From quotations to replenishment, The Distribution Series balances the demands of customer service excellence and the need to optimize costly inventory levels.

The Manufacturing Series

An extension of The Distribution Series, The Manufacturing Series is designed for both assembly and process-type manufacturing operations.

The **Financial** Series

Flexible and easy-to-use, The Financial Series handles multiple companies, divisions, currencies and taxation systems.

Our Customers range from mid-sized to Fortune 500 corporations. Our Multilingual (English, Spanish & French) applications are 100% INFORMIX-4GL® based; an optimal platform for the open systems world.

BUILDING TECHNOLOGY FOR PEOPLE

In Canada and the U.S. call 1-800-922-UNIX Worldwide 514-333-0000 • Fax 514-337-0479

Woodside Technologies, Inc. has introduced Version 3.0 of its Fortress Unix Security System Software.

Version 3.0 offers a "directory tree" database editor, security checks and support for the Open Software Foundation's Motif and Sun Microsystems, Inc.'s OpenLook graphical user interfaces

File-status and inoculation data are now stored in Data Encryption Standardencrypted "protected files databases" to deter hackers, according to the Sunnyvale. Calif., firm.

The product is available for Sun's SPARCstations using the SunOS 4.1 operating system and for IBM's RS/6000s running AIX 3.2.

Fortress is priced at \$495 to \$795 per copy

▶ Woodside Technologies (408) 733-9503

Introl Corp. has announced FlexStor, distributed Hierarchical Storage Management software for Sun Microsystems, Inc. environments.

The product automatically monitors all data on the system and migrates files based on the setup criteria. Migration can be determined by the size, age, date, group or location of a file or by other user-defined parameters.

Noncritical files are relocated from on-

line network disks to a less expensive storage level in the hierarchy.

According to the Minneapolis company, transparent migration between online disks is supported, as well as nearline optical discs or tape libraries and off-line tape libraries. For maximum performance, on-line disks are dynamically optimized.

Prices start under \$4,000

▶ Introl (612) 788-9391

Artisoft. Inc. has announced the LANtastic Interchange software, a product that provides bridging and routing capabilities for LANtastic LAN Version 5.0 us-

According to the Tucson, Ariz., firm, the LANtastic Interchange software will link LANtastic networks that run over dissimilar hardware, cabling and topologies including Arcnet, Ethernet and To-

The product also has the ability to route data packets between networks, transporting each packet to the correct network segment along the quickest and most efficient path, which improves performance and reduces traffic. A statistics feature will let administrators monitor network traffic

The software is priced at \$199 per segment.

▶ Artisoft (602) 670-7100 The [XAC] configuration you want.

At an affordable price.

Assembly no longer required.

AMBRA. WE CUSTOM-BUILD. SO YOU DON'T HAVE TO.

Complete customization — at no extra cost.

Sorry to disappoint all you hands-on, do-it-yourself types. Likewise, you people who insist on paying for every service that comes your way. When it comes to customizing AMBRA™ computers, yod, can leave your tools in the box and your money in the bank. Just send us your specs. We'll build you a ready-torun computing solution including

everything from your choice of processor to your choice of word processor. Plus your choice of options, preinstalled. And you won't pay an extra penny for the service, or wait an extra day.

High-powered technology without high prices.

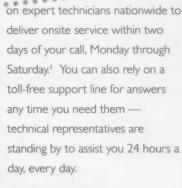
A word to the power-hungry: You can put away that huge purchase order. AMBRA offers the latest and leading industry-standard technology like blazing-fast IBM® Blue Lightning™ processors, Intel® Pentium™ complexes, advanced video subsystems, high-speed local bus architecture, and lots more — for lots less.

Here's how: Sourcing worldwide from the best suppliers, we buy smart and bargain aggressively. And because we keep our overhead low, when you buy direct from us, we pass our savings directly along to you.

Prompt service and support no empty promises.

Now, for you savvy buyers: We know you're looking for more than a mere computing "bargain." Quite rightly, you want to be sure of receiving rapid service and ready support. That's why we've contracted with IBM to back

> AMBRA systems with rock-solid one-year warranties. You can count on expert technicians nationwide to deliver onsite service within two days of your call, Monday through Saturday.1 You can also rely on a toll-free support line for answers any time you need them -technical representatives are standing by to assist you 24 hours a



Money-back guarantees not gimmicks.

Finally, to all our new and soon-to-be-new friends: We absolutely want you to be satisfied with your customized AMBRA system. If, for all reason you're not, you can simply return it within 30 days for a full refund. 12 We're committed to delivering exactly the computer you want, exactly the way you want it, at a price that's only surprising in terms of its thriftiness. We build it your way. To meet your needs. And, if you're not happy, we'll give your money back.



AMBRA invites you to design the world's most important computer. Yours.

SLIM	LINE (3x3)	MONIT	ORS
Processor	□ 486SLC2, 50 MHz □ 486SX, 25 MHz □ 486DX, 33 MHz	I4-inch	□VGA color □SVGA color □UVGA color
Memory Hard disk	□4MB □8MB □16MB □OtherMB □120MB □170MB □240MB □340MB	15-inch	□ AMBRA Flat Square Tube □ NEC Multisync 4FGE
		17-inch	☐ AMBRA Flat Square Tube ☐ NEC Multisync 5FG
DESP	(TOP (5x5)	21-inch	□NEC Multisync 6FG
Processor	□ 486 Blue Lightning, 66 MHz □ 486DX2, 66 MHz	OPTIO	NS -
Memory	□4MB □8MB □16MB □32MB □64MB	OFIIO	NS
Hard disk	□170MB □240MB □340MB □440MB	CD-ROM	☐ Internal drive and software ☐ Multimedia Kit
	TOWER (8-6)	Modems	☐ Data/Fax internal ☐ 2400 bps internal
Processor	TOWER (8×6)	Tape backup drive	☐ 120MB internal/external ☐ 250MB internal/external
	□486DX2, 66 MHz	Graphics	☐ ATI Ultra Pro Graphics
Memory	□4MB □8MB □16MB □32MB □64MB	accelerator	
Hard disk	□170MB □240MB □340MB □440MB	Printers & scanners	□IBM Personal Printer II (24-pin) □IBM LaserPrinter 4039 (12 ppm) □IBM LaserPrinter 4029 (10 ppm, 6 ppm)
EISA	DESKTOP (8x6)		☐ Calera WS Complete PC Scanner
Processor	□ 486DX2, 66 MHz □ Pentium, 60 MHz		
Memory	□8MB □16MB □32MB □64MB	SOFT	WARE
Hard disk	□ 170MB □ 240MB □ 340MB □ 440MB □ 540MB SCSI-2*	Word processing	□Lotus Ami Pro □Microsoft Word® □WordPerfect
		Accounting	Quicken
EISA	TOWER (8 x 12)	Spreadsheet	☐ Microsoft Excel® ☐ Lotus 1-2-3 ☐ Quattro Pro
Processor Memory	□486DX2, 66 MHz □ Pentium, 60 MHz □8MB □16MB □32MB □64MB	Graphics/ presentation	☐ Lotus Freelance Graphics ☐ Microsoft PowerPoint®
Hard disk	□ OtherMB □ I70MB □ 240MB □ 340MB	Comm/fax	□WinFax Pro

□440MB □540MB SCSI-2

^{*}Not available with 486DX2, 66 MHz processor.

Gustomized computers at uncommonly smart prices.



Slimline SuperSavers

- 486SLC2, 50 MHz
- 4MB RAM max: 16MB
- 64KB processor cache
- 3.5" I.44MB diskette drive
- 120MB (19ms) hard disk
- Windows[™] accelerator with IMB video memory
- 3 16-bit ISA slots
- 14" VGA Color Monitor
- Slimline casing (3 x 3)
- MS-DOS® 6.0, Windows 3.1, mouse

\$1,179

- · 486DX, 33 MHz
- 4MB RAM max: 36MB
- 128KB processor cache
- 3.5" I.44MB diskette drive
- 170MB (17ms) hard disk
- 2 VESA local bus slots
- Windows[™] accelerator with IMB video memory
- 14" SVGA LR Color Monitor
- · MS-DOS 6.0, Windows 3.1, mouse

\$ 1,539



Do-More Desktop

- · 486 Blue Lightning, 66 MHz
- Upgradeable to Pentium technology
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" I.44MB diskette drive
- 240MB (15ms) hard disk
- · Onboard SCSI
- 5 16-bit ISA slots (2 VESA on local bus)
- · Windows accelerator with IMB video memory
- ★ 15" Flat Square LR color monitor, NI
- · Network-ready (Ethernet 10BaseT)
- Desktop casing (5 x 5)
- MS-DOS 6.0, Windows 3.1, mouse

\$ 1,979

(For 8 × 6 minitower, add \$50)



Multimedia Minitower

- 486 Blue Lightning, 66 MHz
- Upgradeable to Pentium technology
- 8MB RAM max: 64MB
- 256KB processor cache
- 3.5" I.44MB diskette drive 440MB (12ms) hard disk
- Onboard SCSI 8 16-bit ISA slots (2 VESA
- on local bus) Windows accelerator with
- IMB video memory
- · CD-ROM drive
- Media Vision 16-bit sound card
- Stereo speakers
- * 15" Flat Square LR color monitor, NI
- Network-ready (Ethernet IOBaseT)
- Minitower casing (8 x 6)
- MS-DOS 6.0, Windows 3.1, mouse

\$ 2,549



Pentium Processing Powerhouse

- Intel Pentium processor, 60 MHz
- · 64-bit processor complex
- 8MB RAM max: 64MB
- · 256KB processor cache
- 3.5" I.44MB diskette drive
- · 540MB SCSI hard disk
- · Onboard dual-channel fast SCSI
- 8 32-bit EISA slots (2 VESA on local bus)
- · ATI Ultra Pro Mach 32.
- 2MB VRAM * 15" Flat Square LR color
- monitor, NI Desktop casing (8 x 6; convertible to minitower)
- MS-DOS 6.0, Windows 3.1, mouse

\$4,259

PECIAL OFFER: GET THE BIGGER PICTURE!

★ We're upgrading the view on every AMBRA model with a 66 MHz or Pentium processor — without raising the price! With these systems, instead of the standard 14-inch SVGA, you get a 15-inch Flat Square color monitor. At no extra cost. Limited-time offer. Call for details.

In Canada,3 call 1-800-363-0066, ext. 879

1 - 8 0 0 - 2 5 2 - 6 2 7 2 , EXT.303

AMBRA is a trademark of ICPL1.d. and used under license therefrom. The AMBRA logo and logotype are trademarks of AMBRA Computer Corporation. IBM is a registered trademark and Blue Lighthing is a trademark of International Business Machines Corporation. Intel is a registered trademark and Pentium is a trademark of Intel Corporation. Microsoft Word, Mon-Excel, PowerPoint, and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. All other product names are Indeferents or registered trademarks of their trespective suppliers. Offerings, prices and products are subject to change or withdrawal without prior notice. Prices do not include shipping.

¹ Please call 1-800-252-6272 for details regarding AMBRA's money-back guarantee and fimited warranty. Onsite service may

not be available in certain locations.

Return shipping and insurance charges are the responsibility of the customer.

Offerings may differ in Canada.





The Key To Integrating Your Network And Business Objectives Is An Open View.

Managing your network is Easi managing your business. The key to success is clear vision with an open point of view. Because achieving your objectives requires making all kinds of things work well together.

The Racal Management

The Racal Management
System does just that. It is
now integrated with HP's
OpenView® platform (and we
still interface with IBM®
NetView™), so more companies than
ever can move up to integrated
network management.

Easily tailored, the Racal Management System is capable of managing the widest array of devices in the indus-

try (including Racal's 350 products). Fact is, it's one of the best overall solutions for integrated management challenges. And when it comes to

integrating legacy systems and devices into a common management environment, our Multivendor Integration ToolKit makes a difficult task simple and more affordable. No wonder Communications Week's comprehensive 1993 SNMP Managers test series ranked the Racal Management System "a topnotch management platform" and praised "the degree to which the management of WAN equipment and facilities has been integrated with the system."

Look into network management with an open view. Call 1-800-RACAL-55 for a free information package about integrating your business and network objectives. It's a real eye-opener.



SERVICES
NET MANAGEMENT

Enterprise Networking

NOVELL MHS GOES REMOTE, 68

HP ADDS LAN MAIL, 68

ADVANCES IN VIDEOCONFERENCING, 74

3Com gets house in order

By Elisabeth Horwitt

3Com Corp. moved to put its network management house in order recently when it announced Transcend, a set of applications for managing 3Com's

range of hubs, routers and network adapters.

The applications run on a Windows-based console or the leading Simple Network Management Protosol (SNMP)-based enterprise network management systems, the vendor said.

3Com's delivery of such a system in a timely manner is crucial if it is to compete against its key rivals in the hub arena, Cabletron Systems, Inc. and SynOpties Communications, Inc., said Val Sribar, senior research analyst at Meta Group, Inc. in Westport, Conn.

"Before, [3Com] had a

very fragmented management strategy, principally because they had acquired a lot of products," he said.

During the past year or so, 3Com acquired BICC Data Networks with its Ethernet hubs and Star Tek, Inc. with

its Token Ring hubs to complement its own line of bridges, routers and LAN adapters, wreaking havoc with a consolidated management approach.

By contrast, Cabletron and SynOptics have been shipping for a year or more their platforms for managing

| Compared National Control Co

Transcend manages multiple user devices that can extend across multiple bubs and sites

both their own hubs and other SNMPcompatible devices. These vendors are also offering their management systems as applications on a growing number of leading management platforms, such as Hewlett-Packard Co.'s OpenView and IBM's NetView/6000, Sribar said.

This is a key feature because it enables users to monitor their hubs from the same enterprise management platform that monitors their routers, adapters and networked systems via

SNMP, he said.

While acknowledging that 3Com's network management strategy was "an area of weakness" until now, company spokesman Raj Dhingra claimed that the company has leapfrogged its competitors with Transcend.

Agent in residence

Transcend is an object-oriented system that provides users with the ability to manage "logically related network devices as a single entity" through SmartAgent software that resides on 3Com hubs, routers and bridges, Dhingra said. While

SynOptics and Cabletron have centered their network management strategies around their hubs, 3Com SmartAgents give users the option of installing network management intel-

3Com, page 73

Digital networks

Consortium paves way for 'data superhighway'

By Gary H. Anthes

Seventeen U.S. computer and communications companies, universities and government agencies recently formed a consortium to build high-performance data networks and computer applications intended to prepare the way for the Clinton administration's proposed "data superhighway."

As its first project, the National Information Infrastructure Testhed (NIIT) will set up a high speed digital network linking environmental scientists at nine sites in a "multimedia workgroup application" called Earth Data System. The scientists will share computational resources and earth imagery and other data as if they were working side-by-side.

The consortium said its goal is to integrate existing technologies in distributed computing and advanced communications to implement a number of real-world applications. The efforts will complement the network research test beds being developed by the Corporation for National Research Initiatives and others under

Consortium, page 68

Mobile trends bring higher telecom costs

By Joanie M. Wexler

Integrated Services Digital Network (ISDN) technology could play a significant role in the life of the mobile and telecommuting business worker, depending on the degree of coverage the networks eventually gain.

In fact, Forrester Research, Inc., a Cambridge, Mass., consultancy, predicted in a recent report that ISDN will become the dial-up networking method of choice for mobile users and small offices by 1995. The main reason is that modems do not deliver the same speed and trouble-free operation users are accustomed to with LAN-based computing, Forrester Research analyst Jay Batson said.

Addressing this potential trend, which would result in beefed-up corporate telecommunications activity, some vendors have recently started shipping products that help companies manage their widearea network line costs. DigiBoard in Eden Prairie, Minn., for one, delivered software earlier this month that automatically sets up and tears down ISDN connections to Novell, Inc. LANs whenever appropriate.

Meanwhile, competitor Combinet, Inc.

in Sunnyvale, Calif., shipped a singleuser hardware/software product that works with additional types of wide-area links as well as upper-layer LAN protocols.

No need to log off

Such products relieve companies from having to rely on users to conserve costs. Remote users, accustomed in the LAN world to what they consider "free" bandwidth, tend to set up a call, then leave the

connection open rather than logging off and initiating new sessions when they start work again, said Julie Thometz, DigiBoard's marketing manager of telecommunications.

Meanwhile, their companies pay for unused connections, which can run into multiple hours.

"In a university environment, people tend to log in and stay logged in until they go home," agreed Peter

Olenick, manager of network systems at Princeton University's Computer and Information Technologies Group, a Digi-Board shop.

To conserve ISDN line charges — which consultancy TeleChoice, Inc. in Verona, N.J., said can cost up to 20 cents per minute for the use of just one of Basic Rate ISDN's two 64K bit/sec. channels — DigiBoard created the \$995 PC IMAC for NetWare Systems.

The product's software component is

a NetWare Loadable Module for Novell servers that works with DigiBoard's PC ISDN network interface card.

However, "the question is, how does a piece of computer equipment know there isn't any work being done?" Olenick said. "And if I destroy the link because it's idle, do I lose any [unsaved] changes?"

According to Thometz, the software can distinguish between user data and Novell administrative packets, which in older versions of NetWare's IPX protocols are broadcast periodically throughout the network to ensure that connections are still humming. If the software sees only administrative packets for a particular length of time determined by the customer, it automatically disconnects the session.

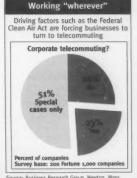
Broad compatibility

Combinet's \$990 version of its Everywhere bridge line plugs into any personal computing device with an Ethernet connection, including laptops, and manages not only ISDN but also switched 56K bit/sec. and dedicated telecommunications connections, according to Bob Downs, vice president of business development.

The Everywhere line is not specific to upper-layer communications protocols; its generic filtering feature allows users to select what kinds of packets they want to control, Downs said.

TeleChoice President Daniel Briere said that videoconferencing is likely to be a growing application for products such as those delivered by DigiBoard and Combinet.

"People turn off the monitor and think they've turned off the link," Briere said. Little do they know the clock just keeps running, he added.



Novell revs up remote MHS | HP updates E-mail

Users will have

more than one

choice of client

software for

Remote MHS

Service allows greater access to NetWare messaging

By Lynda Radosevich

A number of recent developments could make life a little easier for users trying to get their messages and message-enabled work-flow documents from Novell, Inc.'s NetWare networks while on the road or in a remote office.

Work flow does not discontinue when you walk out the door, and the remote issues of connecting and having the work flow go back to the enterprise are an important part of the process that most people forget," said Priscilla Emery, a vice president at consulting company New Science Associates. Inc. in Westport. Conn.

To help managers with remote messaging, Novell last week announced an updated version of its Message Handling Service (MHS). The remote software is aimed at people using portable computers at their desktop and on the road. It lets those users access

NetWare's messaging service with the same interface for either modem-based asynchronous connections or direct network connections.

Some assembly required

To use Remote MHS, companies must have Global MHS, a Novell NetWare Loadable Module that adds store-and-forward messaging functions to LANs running the NetWare operating system. When connected through a network adapter, remote users operate just like network users, but their personal mailboxes are stored on their local drive instead of on the server, according to Novell.

Novell said that Remote MHS will be available by early next month, and that drivers for the wireless RAM Mobile Data Network will be available for free shortly after the product

While the Novell MHS software takes care of the "back-end" communications part of the remote messaging equation, applications vendors are stepping forward with client or "frontend" software.

For instance, Da Vinci Systems, Inc. in Raleigh, N.C., said it plans to ship on Dec. 15 a version of its electronic-mail software for Remote MHS 2.0. The updated software is integrated

with Novell's Remote MHS to allow a simultaneous installation and single-point administration using the DaVinci interface.

Pricing has not yet been set. The current version is priced at \$299 for a DOS/Windows version.

Decisions, decisions

Users will have more than one choice of client software for Remote MHS. Bevond, Inc. in Burlington, Mass., said that its BeyondMail E-mail software for DOS and Windows will operate with Novell's remote back end. Bevond is targeting customers using the work-flow and routing features of BeyondMail.

For example, a remote sales representative can request updates to a local product pricing database by creating a form in BeyondMail and sending it to a pricing mailbox at the main office. Beyond's remote software will be available in November for \$295.

By Lynda Radosevich SANFRANCISCO

Hewlett-Packard Co. announced several enhancements to its electronic messaging software for its proprietary HP 3000 minicomputer at the Interex '93 user conference here last week

The Open DeskManager E-mail system, which HP claims has 1.5

million end users worldwide, will directly link Lotus De-Corp.'s velopment CC:Mail and Microsoft Corp.'s Mail clients. That means that CC:Mail and Microsoft Mail users can exchange messages and share directory services with Open DeskManager users without using gateways. Also, man-

agers can centrally administer the directories and gateways to other systems

In addition, Open DeskManager's support for Lotus' and Microsoft's Messaging Application Programming Interfaces (MAPI) will allow groupware software written to those MAPIs to operate using the Open DeskManager.

"LAN-based E-mail systems today have a limited number of people that each post office can supwith a few thousand people, you have several hundred post offices," said Steve Glagow, director of the electronic-mail service at BIS Strategic Decisions in Norwell,

The HP Open DeskManager has one post office and one place to manage the mail systems, and users have the choice of Microsoft



Source: Hewlett-Packard Co.

Mail. CC:Mail or the HP interface. However, because of its proprietary base, the product aims to maintain the current HP Open DeskManager users and to show that HP is still committed to the product, Glagow said.

HP has a similar E-mail product, called HP OpenMail, for its Unixbased servers. HP said that gateways between Open DeskManager and IBM's Professional Office System are available.

Data superhighway

CONTINUED FROM PAGE 67

the sponsorship of the National Science Foundation.

The consortium's work may also address criticism that the federal government's High Performance Computing and Communications program is long on leading-edge research but short on delivery of real applications to serve broad segments of society

Membership in the NIIT is open to any organization for a small membership fee. William Murphy, chairman of the NIIT steering committee and director of global accounts at Hewlett-Packard Co., said it is impossible to estimate the total contribution of members, with large firms applying the results of investments in the hundreds of millions of dollars.

Murphy said the NIIT is intended to

prove out advanced - but existing technology "and go to market with real live products."

Earth Data System users will be environmental scientists across the U.S. accessing gigabytes of data - for example, detailed satellite imagery of Brazilian rain forests - from remote servers. "The idea is being able to access huge amounts of information in real time in a place you want it to be," Murphy said.

"Also, the scientists may not know what data is available, so this will allow them to collaboratively browse through distributed databases to find out what is available, and then download it at 45M bit/sec.." he added.

Murphy said the intent is to give users tools that allow applications to be distributed, not just high-bandwidth pipes. "It's like we are building a test freeway. The freeway itself is already built, but there are no on-ramps, off-ramps, road signs, hotels, restaurants or gas stations, and there aren't even many vehicles to run on it yet."

Earth Data System is due to be operational in November. The following companies are involved in setting up the NIIT: · AT&T will provide campus-area framerelay networks at several sites, as well as network monitoring tools and highspeed routers as gateways between the frame-relay networks and LANs

·Sprint Corp. will provide nationwide

Asynchronous Transfer Mode (ATM) switching services to enable geographically dispersed sites to act as if they are part of one local group.

·HP will contribute workstations, servers and networking equipment and distributed computing expertise.

·Network Systems Corp. will supply high-speed routers to connect the ATM network and the LANs.

·Oregon State University's College of Oceanic and Atmospheric Sciences will contribute environmental data and research expertise for the application.

·Sandia National Laboratories will contribute expertise in geographically distributed computing, massively parallel computing, networking and information security.

·Smithsonian Astrophysical Observatory will help design and manage development of the application.

·University of New Hampshire's Earth, Ocean and Space Institute will contribute data, research expertise and application design.

·Ellery Systems, Inc. will supply systems engineering and application soft-

Next year, the NIIT will bring up a health care application that will computerize patient records. NIIT said it will later work on applications in education, access to public records, manufacturing and financial services.

Adding to consortium lineup...

he same day the NIIT revealed its plans, Vice President Al Gore unveiled the administration's policy outline for the National Information Infrastructure (NII), a high-performance internet serving users in manufacturing, education, health care and science research.

Gore said the infrastructure will be built by the private sector, with modest government funding--\$1 billion to \$2 billion a year -- for research, tests and standards setting. "The government should steer and not row," he said, adding that the administration will seek legislation to increase competition in the telecommunications industry.

Gore said the administration will establish an interagency Information Infrastructure Task Force and a private sector council to advise the government

"The administration's action agenda sends a clear signal that the further development of the NII is their top technology priority," said James Unruh, chairman and chief executive officer of Unisys Corp. and chairman of the Computer Systems Policy Project. - Gary H. Anthes

COMPAQ WOULD LIKE TO MAKE AN ANNOUNCEMENT OF STAGGERING PROPORTIONS.

TRAPPED IN THE BODY OF THIS TINY SER

This is a story about a small computer engineered to be so dependable, you won't think twice about trusting it with your mission-critical applications. And to be this without filling a closet,

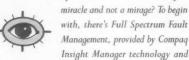
much less a room. If you haven't thought of Compaq as an enterprisecritical platform before, we invite you to grab your bifocals and

begin. (We'll be cramming a lot of information into this ad, which, given how much we managed to fit into our new servers, only makes sense.)

If there's one thing we've learned working with our customers, it's that you're running more and more mission-critical applications on your network. And if your network goes down, your business goes down. All of which makes the introduction of the new Compaq ProLiant Server even more timely.

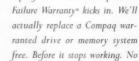
The ProLiant is a new family of affordable, highperformance, easy-to-manage servers engineered specifically to provide the high availability you need for mission-critical networks. We've designed ProLiant in three different models, ranging from a single-processor configuration to a four-Pentium processor model.

Now, how can you be sure our server is truly a



software that continually monitors over 800 aspects of the server's operating status. (For example, Drive Parameter Tracking checks 15 hard-drive parameters.) All of this information is constantly gathered, analyzed and then used to prevent, tolerate or recover from system problems.

If the performance of a monitored component drops below a specified level, our unique Pre-

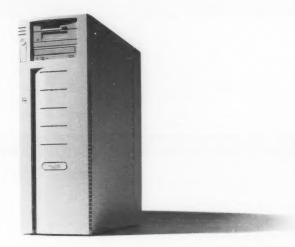


downtime. Ringing cash registers. Happy boss.

Still, no network's perfect. In the unlikely event problems occur, our server exhibits remarkable tolerance. Every ProLiant includes Compaqdesigned hot-pluggable drives. ProLiant Models 2000 and 4000 come standard with advanced error-correcting memory and off-line backup processor features (whereby the server reboots

automatically to a second processor). And, most notably, the Compaq Smart SCSI Array Controller together with the ProLiant Storage System ensures mission-critical data integrity. Should a network problem bring the server down, the Rapid Recovery Systems of the ProLiant are designed to bring it back up.

VER IS A MAINFRAME WITH AN ATTITUDE.



For example, Automatic Server Recovery 2 uses a historical record of server status and performance to perform an astonishing array of tasks. Like intelligently restarting the server, automatically correcting a variety of problems, and accessing a telephone pager to contact network administrators.

By now you'd expect us to have rethought server setup, configuration and OS installation, but you might be surprised by the results. Introducing SmartStart, a CD-ROM system that takes the headache out of getting your server up and running. ProLiant includes a CD-ROM drive and bundled CDs of optimized

Netware and other major operating systems. To get hooked up to your network operating system, simply call your dealer for an access code, enter it, answer a few questions, and leave. Minutes later—say, after you've enjoyed a cup of coffee and a jelly donut—you'll return to find an integrated OS fully installed and optimized for increased performance and improved

management. And we'll keep you updated via CD when new operating system versions appear.

And finally, to accompany our new line of mission-critical servers, we're introducing mission-critical support. With ProLiant, we now offer extensive analysis, installation and service through our CompaqCare System Partners, a select group of highly trained systems experts backed by Compaq engineers. You can now choose 4-hour on-site warranty response upgrade** direct from Compaq. Again, there's our unique Pre-Failure Warranty. And, of course, all Compaq servers come with a 3-year on-site' warranty, and 7-day-a-week, 24-hour-a-day technical support.

All in a surprisingly small box for not a whole lot of money. In fact, a DX2/66 Compaq ProLiant 1000 starts at about \$6000.

Which may help to explain the look your boss gives you when he hears how much money you've saved: stunned admiration. But you'll get used to that. It goes with the territory. For more information on the new Compaq ProLiant servers, or for the location of an authorized Compaq reseller near you,

Compaq ProLiant servers, or for the location of an authorized Compaq reseller near you, just call us at 1-800-345-1518. If you'd like to receive model, feature and specification information immediately via fax, select the PaqFax option. Or, if you'd like that information even sooner, just turn the page.

COMPAQ



THE NEW COMPAQ PROLIANT MISSION-CRITICAL SERVERS

	ProLiant 1000	ProLiant 2000	ProLiant 4000
Hie	H PERFORMANCE N	NETWORK SERVERS	en signatura de la la companya de l Companya de la companya de la
Processor	DX2/66 or Pentium 60MHz	DX2/66 or Pentium 66MHz	DX2/66 or Pentium 66MHz
Architecture	TriFlex/PC One Processor	TriFlex with up to two symmetric processors	TriFlex with up to four symmetric processors
Network Interface	Up to 12 High-Speed Cha	nnels; NetFlex 2 with Packet E	Blaster Technology Standard
Standard Disk Controller	Integrated Fast SCSI-	2 and Smart SCSI Array Contro	oller (selected models)
Storage Capacity	550MB-112GB Internal/external	1050MB-140GB Internal/external	1050MB-140GB Internal/external
Typical Usage	Departmental network services—primarily NetWare	Departmental network application services— NetWare, NT and Unix	Application services for preemptive downsizing NT and Unix
Transaction Rating	50-150 TPS	200-300 TPS	300-400 TPS
Estimated Starting Street Price‡	\$6,000	\$8,900	\$13,900
SERV	ER DEPENDABILITY	AND AVAILABILITY	Y the last control and death to the terms to a to the will
Management	Second-generation Compaq Insight Manager (standard) combines with innovative hardward design to constantly monitor, assess and report server health and performance		
Fault Prevention	Insight Manager alerts you to server status changes in over 800 component parameters, allowing proactive server management backed by 3-Year Pre-Failure Warranty		
Fault Tolerance	Standard support for RAID levels 1,4,5; hot-pluggable drives; on-line spare drive; off-line backup processor§; advanced ECC RAM§		
Fault Recovery	Standard rapid recovery services automatically return server to full operational status even in the event of a critical subsystem failure		
SIMPLI	CITY, EASE OF OWN	ERSHIP AND SUPPO	ORT
SmartStart		nt hardware configuration and sonfiguration for NetWare, NT	
System Warranty	Free Three-Year, On-Site Limited Warranty		
Pre-Failure Warranty	Three-Year, On-Site Warranty replacement of designated components that fall below preestablished thresholds		
4-Hour Warranty Response Upgrade	Optional Three-Year On-Site	Warranty upgrade to 4-hour r	esponse
Technical Support	Toll-free, 7 x 24 technical ph	one support from Compaq eng	gineers
CompaqCare System Partners	Highly trained, dedicated, third-party professionals who provide systems maintenance and comprehensive technical support		
QuickFind/PaqFax	Proactive notification and delivery of new technical information/7 x 24 fax response for updated specification, configuration and settings data		



© 1993 Compaq Computer Corporation. All rights reserved. Compaq Registered U.S. Patent and Trademark Office. ProLiant, Insight Manager and SmartStart are trademarks of Compaq Computer Corporation. Product names mentioned berein may be trademarks and/or registered trademarks of their respective companies. CompaqCare is a servicemark of Compaq Computer Corporation. *Applicable only to advanced ECC memory and disk drives running under Compaq [DA, IDA-2 or \$MART SCSI Array controllers. **Pre-based option supported under CompaqCare and not part of the Three-Year On-Site Warranty. *This service provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Computer Support Center. *Estimated U.S. reseller selling price, actual reseller pricing will vary. The Intel Inside logo is a registered trademark of the Intel Corporation. *Models 2000 and 4000 only.

Enterprise Networking

3Com

CONTINUED FROM PAGE 67

ligence across the range of 3Com de-

For example, a small site that does not have enough users to cost-justify installing a hub can use a 3Com router with SmartAgent to collect information about LAN devices and ship it to a central man-

agement system. A SmartAgent installed in a network adapter can act as a domain manager for a group of PCs.

In addition, 3Com provides a Novell, Inc. NetWare Loadable Module proxy agent that can monitor NetWare installations, Dhingra said.

Transcend also runs as an application on Novell's NetWare Management System as a way of integrating management of 3Com products with NetWare and other SNMP-compatible devices.

Support for other network operating systems is in the works, 3Com said.

Transcend manages multiple user devices as a "logical network" - also known as a "virtual workgroup" - that can extend across multiple hubs and sites, the vendor said. For example, the administrator can define a user workgroup that includes all devices on one hub, plus a couple of users who happen to reside on a LAN in another building, Dhingra said.

The management application can then track traffic and error levels for that user group as a whole, rather than having to track each LAN as a separate physical

But "virtual workgroup definition is a Pandora's box which has limited value with most approaches," Sribar said. He noted this is because of the difficulty of "pulling out management data" from routers and other devices that are being used by different virtual workgroups.

Transcending options

Transcend is available today as an application on the SunNet Manager platform from Sun Microsys tems. Inc.'s SunConnect business unit. It also comes in the form of OS/2-based Smart Agents for hubs, routers and manageable adapters.

LinkBuilder FMS Manager, a Windows-based application for managing 3Com devices, is also available today. A Transcend application for HP's OpenView is due out by year's end; an application for IBM's NetView/6000, Novell's NetWare Management System and Microsoft Corp.'s Windows NT platforms is due to ship next year.

Also in 1994, 3Com plans to ship Transcend connectivity applications for campuses, buildings, remote offices and wide-area network backbones

3Com is also shipping NetBuilder II, a family of solid-state flash memory products that are said to implement Transcend SmartAgents in the vendor's line of Net-Builder II bridge/routers The agents monitor traffic and error levels on 3Com hubs using Remote Network Monitoring and SNMP. A new autodiscovery feature automatically discovers bridge/routers

Pricing for the NetBuilder software ranges from \$350 to \$2,000, depending on the features provided and platform. 3Com also announced a Windows-based Transcend application for managing its LinkBuilder stackable hub, priced at \$495

- Elisabeth Horwitt

SAVE MONEY RECRUITING STAFF

Advertise in Computerworld's regional Careers pages. They work.

800-343-6474 x201



© 1993 Cincom Systems. Inc. The following are registered trademarks of Cincom Systems. Inc.: CINCOM, SUPRA, AD/Advantage, and The Smart Choice
All trade names referenced are the trademark or registered trademark of the respective manufacturer.

new AD/Advantage for Windows, you'll push the boundaries of speed and productivity. Fully-portable applications can be developed and/or deployed on IBM MVS, VSE (CICS and IMS/DC) and VM; most UNIX systems; Digital OpenVMS and OSF/1; DOS

and OS/2. And AD/Advantage supports strategic data bases including SUPRA, DB2, SQL/DS, DL/1, Rdb, Oracle and others.

To find out more about AD/Advantage and to receive a free poster call 1-800-543-3010.

'Everyman' videoconferencing services emerge

By Joanie M. Wexler VENTURA, CALIF.

Though a century ago it was a technical wonder, the telephone has long been status quo on every corporate desktop. And in just a decade or so, the working world has quickly come to expect a fax machine in every office.

Next up on the taken-for-granted list could be commercial videoconferencing services in every neighborhood.

Nationwide retailer Kinko's Service Corp., teaming up with telecommunications company Sprint Corp., said recently it is building a commercial T1 (1.5M hit/sec) videoconferencing and data network The idea is to allow husinesspeople and consumers to dial up full-motion video meetings in Kinko's stores across the country.

Standards at work

Because of video compression standards spanning multiple vendors' equipment, customers will be able to connect not only with other Kinko's stores but also with 3.000 public and private videoconferencing rooms in 38 countries.

Kinko's, known for its desktop publishing and photocopying services, said its goal is to offer the services in 100 Kinko's locations by April and to have all 600-plus Kinko's stores outfitted with Picturetel Corp. desktop and low-end room systems in about two years.

The birth of retail videoconferencing services would represent another option in the corporate user's bag of networking



Kinko's videoconferencing customers can tune into bosses, business partners or Grandma

tricks, business users and analysts said. For example, some said dropping into the local Kinko's for a meeting instead of continually traveling could help them use their time more efficiently and would complement the mobile nature of the emerging "virtual corporation."

"My gut feeling is that this has definite implications for me as a sales tool," said Michael Costantini, a product manager at Ingersoll-Rand Co.'s Process Equipment Division in Nashua, N.H., a Kinko's customer.

Costantini handles all the sales activity at the division. He said he is excited about the new avenue for meeting with existing and potential customers because it could free up time usually wasted in transit for more sales calls. Also, he said, he could afford to communicate more regularly with a key business partner in Japan.

To use the service, users set up a video link by dialing an 800 number; they can

other Kinko's store or in a public or private videoconferencing room somewhere else.

Kinko's has not yet nailed down pricing - or the initial implementation sites - but said it expects the regular hourly rate to be about

When offered at regular rates, though, the service will not initially be priced for the average consumer, said Sarah Dickinson, an analyst at Personal Technology Research, Inc., a market research firm and consultancy in Waltham, Mass. She said that rather than running only high-quality video-

conferences at 384K bit/sec., the company should consider 112K or 128K bit/sec. services to bring the price down.

"At least, consumers will probably want a choice" for a lower-quality link that is less expensive, she said.

On the corporate side, Costantini said he has determined that an average inperson sales call costs \$150 to \$250, "so Kinko's services would have to compete with that."

While Kinko's partner, Sprint, offers its own "drop-in" videoconferencing service, called the Meeting Channel, Sprint spokesman Norman Black said it uses higher-end gear and houses multiple monitors and cameras to accommodate large meetings.

By contrast, Kinko's, at least initially, would be providing smaller-scale and less expensive services. Also, Sprint's Meeting Channel coverage is narrower, with rooms in 65 locations across the country, compared with Kinko's goal of hundreds of store locations, Black said.

Network General offers long-awaited Rmon

By Elisabeth Horwitt MENLOPARK, CALIF

As a concession to users wanting lowercost, standards-based LAN diagnostics and monitoring, Network General Corp. last week announced its long-awaited support of the Remote Network Monitoring (Rmon) standard.

Network General's most basic answer to that need is an Rmon PC agent, priced at \$2,995, that sits on an I960-based PC board and monitors a given LAN segment. The agent can collect statistics from all nine Rmon groups, which include traffic and error analysis.

At that point, the agent sends the raw data to any network management platform to allow users to capture, display and analyze the information, said Pam Larese, Network General product man-

The vendor also announced an Rmon version of its Distributed Sniffer Server product. Rmon information is first sent to the Sniffer central console, running on the Rmon Sniffer Server, which translates the Rmon data into a format that can be processed by the Expert Sniffer software packaged with the Rmon server. The expert system program automatically analyzes incoming information, correlates it, figures out the most likely cause of a problem and guides the user through the process.

However, these features come at a cost. Each Rmon Sniffer Server starts at \$9,495, including hardware that runs on a nondedicated 286 PC. In addition, users need the Sun SPARCstation console and software to act as a collection and display point, as well as the Rmon agents.

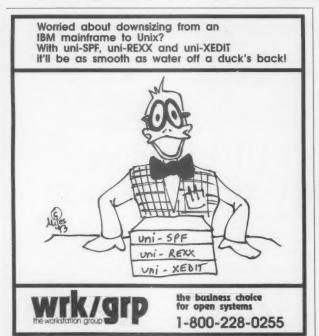
Network General can get away with high-end pricing because "no one beats them at decoding and analysis," said Val Sribar, senior research analyst at Meta Group, Inc., a Westport, Conn., research firm. However, Network General needs to catch up with LAN diagnostic software vendors that are busily teaming up with leading network device vendors such as Cabletron Systems, Inc. and SynOptics

Communications,

Inc., Sribar said.

The fruits of these alliances will be hubs and routers that monitor and diagnose their own LAN segments. Sribar said. Hewlett-Packard Co. is working toward this with its recent acquisition, Metrix Network Systems, Inc., whose diagnostic software runs across a variety of platforms, includ-

ing SynOptics hubs, Sribar said. In the works is an HP application on OpenView that will collect and correlate data coming in from both Metrix's and HP's LAN diagnostic products, Sribar said.



Network General is adding Rmon capabilities; several levels of functionality are available Rmon PC agent Expert Sniffer Lower cost per segment
 Supports all nine groups
 High performance rate
 Fits into any 2861+ PC (nondedicated) . EN, TR, SIS Rmon and Expert Analysis • \$9.495 · \$7,495 to \$9,495 (nondedica • \$2,995

Sniffer options

a Sun Microsystems, Inc. SPARCstation. which monitors multiple LAN subsegments in real time using a graphical user interface. Larese said.

The console can then send the data to

66 Micro Focus is helping us to rightsize development, and our customers to rightsize their applications.



American Software is an Atlanta-based software vendor, marketing solutions for the distribution, utilities and manufacturing industries. Established twenty years ago, it has grown rapidly to its position today as a \$100m, 950-employee organization.

As Vice-President responsible for Planning Systems, the company's best known product line, Mike Keesee believes that responsiveness to customer needs is key to American Software's success. With the company targeting its solutions in the DOS, UNIX® and OS/2® environments, flexibility is fundamental.

"We selected Micro Focus early on as the

tool of choice. We're a COBOL company and Micro Focus offered the ability to move from the mainframe environment to the PC environment swiftly, leveraging the expertise that we already had in-house," says Keesee.

The reaction at American Software to now working on the PC, Keesee points out, is very positive. "The developers will never go back to mainframe development again. No one here wants to return to mainframe development once they've had a taste of developing with Micro Focus Workbench.""

"The Micro Focus Downsizing Solution is one of the cornerstones of that very strategy. It provides us with a flexible, cost effective means of leveraging existing COBOL skills and tools to develop new products quickly."

"What's more, Micro Focus as a company has offered us the same openness and responsiveness that we seek to offer our own customers."

When the world's leading corporations demand "A Better Way of Programming," they turn to Micro Focus. For more information on putting the Micro Focus Downsizing Solution to work for you, call 800-872-6265.

MICRO FOCUS

Enterprise Networking

Xyplex, Inc. has announced the 301 Port Switching Token Ring concentrator for the Network 9000 Routing Hub.

The product provides 12 RJ-45 Token Ring ports that support unshielded or shielded twisted-pair cabling and can operate at either 4M or 16M bit/sec., according to the Boxboro, Mass., company.

The concentrator offers dynamic error detection and two automatic ring wrap

The product costs \$1,995.

> Xyplex (508) 264-9900

Crescendo Communications, Inc. and Hewlett-Packard Co. have introduced 32-bit Extended Industry Standard Architecture (EISA) adapters that support HP Apollo 9000 Series 700 workstations

using Fiber Distributed Data Interface (FDDI) over shielded and unshielded twisted-pair and fiber-optic cable.

The EISA-HP adapters provide 100M bit/sec. connections for an HP workstation to an FDDI or Copper Distributed Data Interface (CDDI) concentrator, according to Crescendo in Sunnyvale, Calif.

The product line includes the C320-HP CDDI EISA adapter, C321M-HP FDDI adapter and the C316M FDDI EISA and C325 CDDI EISA dual-attach options.

Prices range from \$695 to \$1,995.

► Crescendo Communications (408) 732-4400

Linkon Corp. has introduced FaxPeak, an interactive voice response communications board with speech recognition and fax capabilities for Unix computers.

FaxPeak enables an organization to automate the delivery of information to its customers through a number of services ranging from fax broadcasting to fax-on-demand, according to the New York company.

Using one slot on a computer, FaxPeak can fax data and receive voice on up to eight different ports simultaneously.

The product also includes Linkon's LinkEngine multimedia communications board, fax and voice software.

FaxPeak is available for \$2,995 for four channels and \$4,995 for eight channels.

▶ Linkon

(212) 753-2544

Thomas-Conrad Corp. has announced the Sectra Network Management System, a report-oriented, Windows-based platform for network management.

According to the Austin, Texas, firm, Sectra was designed to accommodate multiple protocols and segments, exponentially increasing management needs.

The Sectra wiring hub supports Token Ring, Ethernet and Fiber Distributed Data Interface protocols. The company announced plans to provide a growth path to Fast Ethernet, Asynchronous Transfer Mode and other protocols as they ap-

The product is priced at under \$5,000.

▶ Thomas-Conrad (512) 836-1935

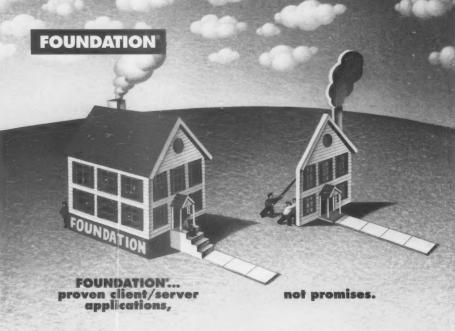
Siren Software Corp. has introduced Siren Mail, an Internet electronic-mail and fax communications center for open systems platforms.

The product offers the Open Software Foundation's Motif- and Windows-based character interfaces and uses standard TCP/IP and Unix mail transports, RFC822/MIME Internet protocols and fax servers to send mail messages and documents.

Siren Mail includes a built-in message editor that automatically formats the text of a message as a user enters it, according to the Menlo Park, Calif., firm.

A single-user license of Siren Mail costs \$295, a five-user license \$1,395 and a 10-user license \$2,495.

▶ Siren Software (415) 322-0600



We're introducing our next generation of **FOUNDATION**° for Cooperative Processing (FCP). This powerful tool lets you take advantage of the experience of **FOUNDATION** customers who have successfully implemented client/server applications over the past two years, both departmental- and enterprise-wide.

Whether you're looking for a system for 50 or 500 users, PCP will help you deliver. The new Rapid Application Builder dramatically simplifies

development, providing you the ease and speed of point-and-click techniques. FCP boosts your productivity and gives you a complete client/server foundation to meet your changing business needs. Right now, you can receive a free informative diskatte which details the nor tages of FOUNDATION for Cooperative easing. To get your copy just call us a 1-800-458-8851. Outside the U.S. and da call 1-312-507-5161. Get the proven solution to client/server developmen working for you, today.

Software Products



Can I get the perfect network solution and someone to keep it that way?



Think of every Novell Authorized Reseller as two highly trained individuals in the same body.

One is a salesman (there, we've said it) who knows he has the best networking products

Authorized Gold Platinum

The Novell Reseller Channel has three levels to provide everything from basic networking solutions to complex, enterprise-wide systems.

available and can't wait to put them to work for your company.

The other is a business partner who knows that some day your network may have to be reconfigured or expanded. And you're going to need help to do it right.

The Novell Reseller Channel is a unique sales and support infrastructure designed to meet a range of needs. Their staff can provide you with strategic consulting to assess how technology can meet the ongoing needs of your business, whether you're networking a small group of PC users or establishing a host to network link service.

Does this vast store of technical expertise make them good salesmen too? You bet it does.

Call us at 1-800-453-1267, extension 5205, for a nearby reseller that fits your needs.



NOVELL. The Past, Present, and Future of Network Computing.

AT&T's new 800 Service Features and better productivitythere's definitely a connection.

When customers get busy signals, they may hang up—which can make your productivity picture look less than beautiful. Fortunately, AT&T's developed innovative new 800 Service Features that can help your business manage more calls, efficiently and effectively...all without buying and maintaining premises-based equipment and additional lines.

Say, for example, you're experiencing

heavy call volume. AT&T can put callers at ease with a customized announcement letting them know all agents are busy and they'll be connected to an agent soon. It's called "Network Queuing" and it helps your business get more calls through, efficiently distribute incoming calls and

distribute incoming calls and effectively handle calling volume peaks. It's an exclusive AT&T feature. You simply won't find a

network solution like it anywhere else.

Network Queuing More than a sound business decision—a direct connection to greater productivity. For more information about this and other new AT&T 800 Service Features, call your Account Executive or 1 800 222-0400.

Network Queuing. One of the 800 reasons $^{\text{SM}}$ to choose AT&T 800 Service.

AT&T. The Best in the Business.[™]



Users gain cluster ability

By Thomas Hoffman NAPERVILLE. ILL

NCR Corp. recently added fault-resilient software to its product cache, providing NCR System 3400 and 3500 users with the ability to cluster as many as four servers to one another.

The package, dubbed NCR Life-Keeper FRS Clusters, supports the parallel server feature of Oracle Corp.'s Oracle 7. The parallel server is a single but distributed parallel database environment that enables users to run the same application across multiple servers.

Data sharing

LifeKeeper FRS Clusters features a distributed lock manager that allows the systems that are clustered to share information using the Oracle parallel server. The core package was designed to maintain a "heartbeat" between systems and, in the event of system failure, switches applications and communication interfaces to another system in the cluster.

The package is a follow-up to LifeKeeper FRS, a set of fault-resilient software that NCR introduced for its midrange computer systems last January. LifeKeeper FRS provides high-availability and failover between two systems, while the latest package secures data between two to four systems and additionally supports database clustering, according to Asif Naseem, manager of strategic planning and solutions services for NCR's midrange computer systems division.

IBM, Sequent Computer Systems, Inc. and Pyramid Technology Corp. have already introduced Oracle clustering software, according to John Morrell, research manager for Unix software at International Data Corp. in Framingham, Mass. However, NCR's Life-Keeper was designed with additional failover capabilities that competing products have not yet addressed, Morrell said.

Michael Garrison, manufacturing and industrial engineering manager at State Industries, Inc., said the Ashland City, Tenn., water heater maker plans to purchase the LifeKeeper package when it adds a second NCR 3450 server in the next six to 12 months. "We'll want fault-resiliency between those servers when we put the second [NCR] 3450 in, so we're already talking to NCR about Life-Keeper for that." Garrison said.

LifeKeeper FRS Clusters, which runs on 2.01 RAS of NCR's version of Unix System V Release 4, is priced from \$9,000 to \$40,000 per system. Early shipments have already begun, with general availability of the products slated to begin at the end of December.

Mervyn's Vivian Ste-

phenson: The compa-

ny is on target with

duction plan

its 1993 inventory re-

NCR eyes software growth with new unit

COLUMBIA. S.C

NCR Corp.'s establishment of a dedicated software division is being viewed as an effort to unite diverse software efforts and to create the links necessary to carry out parent company AT&T's goal of a new portable computing envi-

The software division is also expected to lay the foundation for tighter development links with AT&T and Bell Laboratories, Inc. as AT&T moves forth with its plans to create "anytime, anywhere" portable computer software and

Software and services now make up more than 40% of NCR's annual revenue, or nearly \$3 billion, according to Peter Kastner, a vice president at Aberdeen Group. a Boston-based market research

However, although NCR's services revenue is growing at a faster pace than that of IBM, Digital Equipment Corp. and Unisys Corp., Kastner estimated that software sales currently account for only 7% of total revenue, or less than \$500 million. This sales figure includes NCR's version of the Unix System V Release 4 operating system.

With the new software division, Kastner said he believes NCR will be better positioned to ex-

pand and develop its product cache. "NCR's software products have, to a certain extent, been languishing in different product groups. They may well do better in the full sunshine of their own product group instead of being shaded by bigger and more important product groups than they had been in," he added.

James E. Clark, who will head up the new software division, agreed. "We weren't getting

the full thrust of the corporate might behind those efforts," he

Porting potential

For customers, the new division likely means NCR software will eventually become available on non-NCR hardware platforms. In addition to ongoing development efforts to migrate NCR software beyond its Unix environment to Microsoft Corp.'s Windows, Windows NT and IBM's OS/2. Clark said NCR plans to port its products to other platforms where user demand is strong.

"If there are enough customers who want that, [porting] will be done on a Hewlett-Packard platform, or Sun or IBM," Clark said.

Although Clark said the software division will focus primarily on product development for NCR's System 3000 platform, he added that competitive platform ports will be encouraged.

NCR, page 105



form ports will be en-

Client/server

Department store tackles inventory stockpiles

By Mark Halper PLANO, TEXAS

Vivian Stephenson, vice president of MIS at Mervyn's department store, harbors no illusions of dismantling the mainframe operations that still run most of the company's business functions.

She does, however, see the wisdom of passing the data housed on the IBM ES/9000 mainframe down to a client/server system for processing on a Unix server and PCs. as evidenced by a new inventory management system that she estimates will help save the company millions of dollars this year.

"Mervyn's has the strategy to reduce inventory by \$2 million to \$3 million, and this is one of the tools that will allow us to do that," the MIS chief said.

After a four-month development period using KnowledgeWare, Inc.'s ObjectView development tool, the company launched its Planned Store Inventory (PSI) program last February on a 12-processor Sequent Computer Systems,

Inc. Symmetry 750 Unix box housing an Oracle Corp. Oracle 7 database. Stephenson declined to say how much the company spent on hardware and software.

PC users download raw data from the mainframe into their ObjectView-based application, which transforms the data into a format recognized by a modeling application that resides on the Sequent

The ES/9000, meanwhile, continues to draw data that is updated daily from Mervyn's stores via a satellite connection.

Stephenson said the company is on target with its 1993 inventory

reduction plan. Mervyn's senior technical analyst Steve Houston said the store runs about 26% of its inventory through PSI; he estimated

Reality check

In its early system development stages. Mervyn's ran prototype inventory management systems on PCs that mimicked real-world merchandise movement.

Until last February. Mervyn's ran inventory management on a mainframe, which broke down demographic differences only by region, not on a store-by-store basis.

that it may eventually use the system to handle 75% of its goods.

Much of the store's nonfashion menswear items such as jeans, slacks and underwear are on the system, Houston said, but fashion clothing is not yet. "They're harder to do because they change every three months," he not-

Merchandisingaid

The benefits of the new system are twofold because Mervyn's PSI also figures out exactly what merchandise is needed in particular stores, and when,

Before the retailer installed PSI, its approach to determining which items to ship where was practically a manual one, Houston said, Users would draw data off the ES/9000 using NCR Corp.'s 386-based Teradata database machines and the Focus fourth-generation language from Information Builders, Inc.

"They also used a lot of calculators," he re-

Mervyn's, page 80

Mervyn's tackles inventory stockpiles

CONTINUED FROM PAGE 79

The new precision merchandising translates into more sales — which Stephenson declined to estimate — and higher customer satisfaction because it increases the chances that consumers will find what they want to buy.

To illustrate the point, Stephenson

noted, "We have 275 stores in 15 states, and we're trying to figure out how many red medium-size T-shirts to send to each of them, when you have different demographics in each."

Valuable Information

The intelligence of the Sequent based PSI provides Mervyn's with such vital in-

sights as to send lighter-colored shirts to Florida, helping the company avoid an overstock of red where red is not wanted, who said

Since installing PSI, Mervyn's figures that it has scored at least a 98% success rate in having an item in stock when a customer requests it.

Meanwhile, Mervyn's client/server op-

eration resembles its mainframe setup in one logistical sense: Mervyn's Sequent box sits far away from its Hayward, Calif., users, in a glass house with the ES/9000 in Plano, Texas.

Mervyn's moved data center operations to Texas two years ago because the old site, at the company's Hayward headquarters, sits squarely on a geological fault line.

Systems link

In Hayward, about 100 inventory control analysts operate PCs — tied together on a Token Ring network — that access the system via leased T1 lines running to Plano. An Interlink Computer Sciences, Inc.

Mervyn's

Plano, Texas

Challenge: To reduce

increase sales by having

the right products at the

right stores at the right

Strategy: In-house-

developed inventory

management system

Oracle database tied to

a network of PCs on one

mainframe on the other.

Status: On target to cut

million to \$3 million this

year. Company expects

with the new system by

to control inventory

sometime next year.

inventory costs by \$2

that uses a Sequent

minicomputer and

end and a host

inventory costs and

gateway in Plano provides the final link into the ES/9000's channels.

Houston said that developers spent arduous hours sorting out memory management conflicts between the PCs, which tie into the Sequent box over TCP/IP but also run Novell. Inc. NetWare for other tasks.

"Having the right merchandise in the right stores at the right time sounds simple, but it's difficult to execute," Stephenson said.

Still not a

mainframe
Not everything
is up to par. Stephenson noted
that the system
still lacks the sophisticated se-

curity and change management features the company has grown accustomed to in the mainframe world.

"Some of the things we got used to on the mainframe system are still in their infancy on the client/server side," she said. "We haven't had problems, but we don't consider them to be up to mainframe standards."

Finding the Solution You Need Just Got Easier

Announcing Computerworld's 1994 Consultants Directory



A special pullout-and-save section appearing in Computerworld's September 27 issue

The solution you're looking for is now at your fingertips. Computerworld's Consultants Directory is a comprehensive listing of solutions providers across the U.S. Our Consultants Directory gives you quick and easy access to outside IT providers including systems integrators, consultants, and application developers.

Solutions providers whose services cover the range of your information technology concerns — from client/server computing, CASE, 4GL, applications development to education/training and information reengineering. With listings referenced by state and by speciality, this is one reference source you'll want on your desk throughout the year.

COMPUTERWORLD
The Newspaper of IS

Computerworld's Directory

105

Look for it in

ê

An International Data Group Publication

HOW TO SELL USED EQUIPMENT.

Advertise in Computerworld's Classifieds. They work.

800-343-6474

PORTRAIT OF THE IDEAL IS Manager

Digital's POLYCENTER Solution Paints a Better Alternative for Systems Management

he truth of the matter is this: your IS manager has only two hands. Of course, for your mainframe environment, that may have been enough. He or she managed a system that was located inside a single glasswalled computer room - probably right around the corner from his or her office.

That scenario is changing. And changing rapidly. Downsizing from mainframes, even large clusters, to small distributed servers linked with PC clients presents new and challenging system and network management requirements.

All the traditional functions IS once performed - maintaining corporate data integrity, maximizing performance, reducing costs, planning capacity, and **Imagine** more - must now be pera totally intelligent,

formed by individual users who may not be as experienced as IS professionals, and systems, working across an entire who could be located on the other side of the campus, the country, or the world.

Today, businesses **POLYCENTER** that are moving to netstrategy. work-based, multivendor, distributed processing environments can turn to Digital for a complete systems and network management solution that's costeffective. It's called the POLYCENTER solution.

Meeting the Challenges of Your Complex Computing Environment

According to the 1993 Sentry Market Research Survey, IS managers listed lack of systems man-

agement control as the greatest impediment to successful client/server implementation. In fact, the movement toward distributed computing brings with it a number of specific needs in the areas of

- Storage Management
- Configuration/Change Management
- · Fault/Problem Management
- · Performance/Capacity Management

self-managing environment

of networked computing

enterprise and all its multi-

vendor system platforms and

networks. This is Digital's

Security Management

Digital's full range of POLYCENTER products and services offers comprehensive solutions in each one of these areas. What's more, based on industry standards, the POLYCENTER solution is an integrated and open approach to

managing enterprise systems and distributed networks, including those based on OpenVMS, OSF/1, ULTRIX, other UNIX vari-

ants, IBM MVS, MS-DOS, or Windows NT operat-

And as needs and technology change, so will POLYCENTER offerings be enhanced to meet all your business requirements - today and in the

Three Requirements -**Three Solutions**

Three POLYCENTER products that have been newly enhanced include DEC Network Save and Restore (DECnsr), POLYCENTER System Census, and POLYCENTER Scheduler, Each product addresses an area of management made more complex as a result of the move toward a client/server environment.

For Storage Management, You Need DECnsr Software

Storage management means making sure information is protected as well as quickly retrievable.

In a mainframe environment, the disk drives are all in one place - making the process of backing up data relatively easy to monitor and control. However, in a client/ server environment, you're dealing with a variety of PCs and workstations. Users have disk drives right on their desks, and the information they keep on these drives is often critical to the company. Thus, backup is not only a good idea, but also essential. Yet, what are the chances that every user will back up their data

With DEC Network Save and Restore, backup is automatic - and nothing is left to chance. No matter where data resides in the corporation and no matter which desktop client that information resides on, DECnsr software provides backup services either to a single system or to a group of systems on the network, and retrieves data from backup copies, when

Most important is the fact that DECnsr software is one of very few backup solutions that offer support for a wide range of platforms including those of Digital, IBM, Hewlett-Packard, Sun, and others, as well as DOS

In addition, DECnsr software provides easy backup, restore, and fast file location operations, simultaneous output to multiple devices, and media management index for tracking tapes, among many other capabilities.

The benefits of DECnsr software are clear. You can

expect not only a substantial decrease in lost data and lost time but also a dramatic increase in data integrity.

Configuration Management Made Easy with POLYCENTER System Census

Configuration management essentially means knowing what assets you have, where they're located, and in what condition.

In a mainframe environment, an IS manager simply has to walk into the computer room. But, it becomes more complicated when you're responsible for 50, 100, 500, or more multivendor systems distributed throughout the country or around the world.

Through three types of modules - data collection agents that reside on the network and collect information on their particular systems, a data consolidator that manages and updates a central database of all agent information, and a graphical user interface for easy identification of objects in the central database - POLYCENTER System Census software automatically gathers and displays system configuration information quickly, clearly, and

Information that is routinely available upon request includes:

- · Hardware data, such as processor, memory, disk, tape, print server, adapter, and controller
- · Software data, such as name, version, type, and license for operating system and layered continued \(\mathcal{O} \)

PUTTING IMAGINATION TO WORK

I magine an integrated approach to managing enterprise systems and networks.

digital

continued

 Logical structure data for VAXcluster systems (OpenVMS specific), disk partitions (ULTRIX specific), queues, and users

What else can the POLYCENTER System Census do for you? It can increase productivity by freeing scarce operation resources, plus reduce costs by uncovering any configuration redundancy.

POLYCENTER Scheduler Offers Increased **Automation Functionality**

Increased automation of business operations can translate into higher productivity, better service, and lower costs.

But automating tasks within a client/server environment is a tremendous undertaking for IS managers. Automating one mainframe system is not difficult compared to the process of automating tasks on many different systems distributed on the network.

Digital offers you the solution -POLYCENTER Scheduler. A production scheduling application that operates across LANs and WANs in a mixed OpenVMS, ULTRIX RISC,

Windows NT, or DEC OSF/1 AXP environment, the Scheduler automates monitoring, scheduling, and repetitive applications such as payroll, manufacturing, resource planning, and financial consolidations

It accomplishes all of this through a server module that keeps track of all the time elements involved (contingency plans, calendar dates, hours/minutes, etc.) and through client modules located on the network that actually run the rasks.

Digital's POLYCENTER Scheduler can help you cut error rates of production jobs, avoid costly reruns, reduce slack time between jobs, maintain job integrity through error recovery, plus much more. The bottom line? Greater productivity and even greater savings for your

For details on workshop registration, or to request a copy of the "POLYCENTER and Enterprise Information Systems Management" report, prepared by the Aberdeen Group, call Jill London at 800-457-8211.

	UNIX Workshops	LOCATION	OPENVMS WORKSHOPS
	10/6/93	New York City, NY	10/7/93
Digital is presenting a	10/20/93	Salt Lake City, UT	10/21/93
series of operations	10/27/93	Dallas, TX	10/28/93
	11/3/93	Boston, MA	11/4/93
management workshops	11/9/93	Dayton, OH	11/10/93
entitled "Managing	11/16/93	Nashville, TN	11/17/93
Technology in Transition."	1/12/94	San Francisco, CA	1/13/94
Topics will range from	1/19/94	Detroit, MI	1/20/94
	1/26/94	Edison, NJ	1/27/94
performance analysis to	2/9/94	San Diego, CA	2/10/94
network management to	: 2/16/94	Chicago, IL	2/17/94
storage issues and more.	2/23/94	Washington, DC	2/24/94
Attendees will also	3/2/94	Orlando, FL	3/3/94
see live demonstrations	3/9/54	Seattle, WA	3/10/94
	3/16/94	Milwaukee, WI	3/17/94
of solutions to actual	3/23/94	Hartford, CT	3/24/94
operations problems.	3/30/94	Philadelphia, PA	3/31/94
Find out how you can	4/6/94	San Antonio, TX	4/7/94
manage the new client/	4/13/94	Long Beach, CA	4/14/94
server environment of	4/20/94	St. Louis, MC	4/21/94
SOLACE OLIVILOS ILIGITED SOLACE	The second live to the live to	THE RESIDENCE OF THE PROPERTY	

TALK ABOUT A COMPLETE MIGRATION SOLUTION Digital Gives You the Prime Example

the '90s at a FREE

workshop near you.

DIGITAL OFFERS YOU A WAY TO PROTECT YOUR INVESTMENT IN

PRIME COMPUTERS.

THROUGH OUR COM-PREHENSIVE SET OF

MIGRATION SERVICES

YOU CAN MAKE A **TECHNOLOGY TRANSI-**TION THAT'S RIGHT FOR YOUR COMPANY.

he economy has taken its toll on computer suppliers. However, there is a "light at the end of the tunnel" for those suppliers that have the ability to respond quickly to customer business needs. Digital is one such organization - finding new opportunities to help companies respond to today's business challenges

But, where does that leave you? Or, more important, where does that leave your current computing investment?

A glance at today's headlines shows some computer companies consolidating and redefining their products and services to better meet your needs. Digital has been listening carefully to your concerns and is pre-

How? By offering you a long-term, stable computing environment, a 25-year architecture with Alpha AXP, database and graphics capabilities, and a clearly defined path to get there. Together with recognized software vendors, Digital will provide the hardware products and software conversion tools you need to migrate to VAX VMS, Alpha AXP running OSF/1 or OpenVMS, ULTRIX on DECsystems, or SCO UNIX on Intel

In short, we can provide you with a complete set of migration solution services.

Good News for Prime Customers

To remain competitive in today's market, businesses must anticipate their computing needs. Companies currently dependent on Prime technology are facing several challenges, including when and how to:

- Upgrade current technology without losing the entire investment in their Prime-based solution
- Move their business applications to a computing architecture that meets their open systems requirements
- Plan the migration to a new platform within a timeframe that makes good business sense and is easy to implement

- Implement a client/server strategy
- Contain or minimize operation costs

In spite of these challenges, there is good news. Through its investment protection program called Digital Solutions for Prime, Digital offers Prime customers a clear growth path to 21st century computing.

Simple, Practical Solutions

Whether your business goal is migration, coexistence, technology upgrading, or containment of operation costs, Digital has the consulting experience and tools you need today. In fact, our Solutions Integration Unit - along with our Independent Software Vendors was on hand at the National Prime Users Group Conference recently to demonstrate Digital Solutions for Prime on the Alpha AXP platform.

Companies previously dependent on Prime have transitioned easily to Digital platforms because of all we have to offer, including:

- Prime migration/conversion consulting experience and extensive tool A choice of operating system environments such as PICK, OSF/1,
- OpenVMS, ULTRIX, and SCO UNIX An unparalleled selection of software applications for each of these
- operating system environments
- Multivendor systems and network service

What's more, Digital offers unbeatable price/performance for a full range of systems, from the desktop to the data center. For companies considering Digital for the first time, we will cut your Prime mainte-

For information on Digital Solutions for Prime, call 508-467-6178. To schedule a multivendor service assessment, call 800-332-4636 and request a Digital representative in your area.



WHAT YOU WANT IS WHAT YOU GET

ntroducing the StorageWorks product family — Digital's giant step forward in the quest to offer cost-effective, open storage solutions. And the credit goes to you.

Recently we started talking — and listening — to our customers through a number of different avenues including surveys, on-site visits, and product direction forums. You spoke candidly about your business situations, your needs, and your expectations.

As a result of these discussions, Digital arrived at a computer storage strategy that answers all your requirements. The StorageWorks product family is the result of that strategy.

In brief, Digital's StorageWorks products can provide you with the flexibility to attach industry-standard storage devices across SCSI-based systems for CI clusters. In the future, this flexibility will extend to DSSI clusters and FDLA rings. Easily integrated with our current SDI/STI and RF/TF products, the StorageWorks products enable you to choose solutions that strike an ideal balance of performance, availability, and cost for nearly every storage requirement.

It's Yours for the Asking

Listen to the people who buy the products. It's a simple but important philosophy. And once we listened, the rest was easy.

You asked for a number of must-haves for storage solutions in the downsized business environments of the '90s. Not only should this new generation of storage be based on open standards, but it should be:

- High-performance
- Flexible
- Cost-effective
- Reliable
- Modular
- Easy to configure, to maintain, and to grow

And, most important, you sought to protect your current investment in storage and your new investment well into the future. In other words, you asked that we make storage work not only for Digital platforms but also for a variety of multivendor platforms.

With StorageWorks products, Digital has begun to fulfill all these business requirements. We've recently introducted our first line of StorageWorks products running on Digital platforms. And, as we continue to stay close to customer concerns, this product family will soon evolve into confederive multiplatform solutions for your ever-changing, multivendor environment.

What Is the StorageWorks Solution?

We've all ordered a hamburger just the way we want it — the works, no pickles, a little onion, or just a dab of mustard. Imagine doing the same with storage. Imagine acquiring a storage solution that is customized specifically for your business.

The StorageWorks family of products implements a complete subsystems strategy that enables you to obtain the exact storage you need by choosing from an interchangeable set of components. These include storage devices, controllers, power, packaging, interconnects, cache, and software.

COMPETITIVELY
PRICED

in a storage solution.
And, now, that's exactly
what Digital delivers.

This modular approach makes it possible for you to mix and match devices and components in almost unlimited combinations. What's more, by designing these storage products so that you can replace every component yourself, Digital has achieved a breakthrough in storage cost-ofownership.

It Begins with Building Blocks

SCSI-based storage devices such as magnetic and solid state disk drives, tape drives, and CD-ROM drives — housed within carriers — are the basic building blocks of StorageWorks subsystems. These building blocks are easily snapped in to or out of StorageWorks shelves and enclosures when you want to expand or reconfigure your data storage capability.

Digital's family of StorageWorks controllers will optimize the performance of these building blocks through unique features that enable SCSI devices to achieve "bet-your-business" levels of availability, including the benefits of RAID (Redundant Array of Independent Disks) technology.

Key StorageWorks enclosure components include:

Building block shelves



Supporting multiple building blocks either in cabinets or at deskside when enclosed in a pedestal kix

Controller shelves



Supporting electronics so as to provide enhanced capabilities to devices operating on multiple SCSI buses .

Datacenter cabinet



Holding building-block and controller shelves plus tape backup subsystems to provide complete storage solutions

In addition, desktop expansion units enable PCs and workstations to use the same building blocks you configure on larger systems. And redundant elements and battery backup can be added at any time to build highly available configurations.

The Future of StorageWorks Products

As StorageWorks solutions extend beyond Digital platforms to focus on multivendor platforms, we will place increased emphasis on developing business partnerships to enhance our expertise on a variety of non-Digital platforms.

We will also continue to measure our products against those of our competition. If we need to change direction to stay ahead of customers' needs, so be it.

After all, Digital intends to be a leader in the storage solution business. With your input and our expertise, it won't be very long before that goal is achieved.

To learn more about Digital's StorageWorks product family, call 800-DIGITAL (800-344-4825), reference code BFF, and ask for a FREE StorageWorks information diskette.

PUTTING IMAGINATION TO WORK

digital

DIGITAL IS YOUR FIRST AND LAST SOURCE FOR

NETWORKING SOLUTIONS Imagine a company that understands vour networking challenges. An industry leader that not only offers you best-in-class components, but also fully implements mission-

igital is very much in the business of open networking. With a full line of compatible, standards-compliant, high-performance products, including network interface cards (NICs), intelligent hubs, multiprotocol routers, switches, networked servers, network operating systems, and mobile/wireless products, Digital's networking solutions will provide easy, transparent access to data anywhere in your

Depending on your level of networking expertise, you may simply want to purchase individual cost-effective products, or you may want to take advantage of our full range of network products and services. Better yet, you can focus on your business while Digital takes care of complete implementation of a network strategy — customized to perfectly suit your business requirements.

Success Based on Experience

When it comes to networking expertise, experience counts. As an industry-leading systems integrator, Digital was chosen by many global companies to install their enterprise networks from settling connectivity issues and meeting internetworking challenges to providing management capabilities from branch offices to regional sites and corporate headquarters.

Digital's work with market leaders in aerospace, finance, and retail industries, to name a few, has helped us develop a thorough understanding of the complete networking problems businesses face. This work has allowed us to gain valuable experience in providing client/server computing that spans from network interface cards in desktop PCs to branch office solutions to corporate backbone networks, including the datacenter.

And in this decade of upsizing, downsizing, and rightsizing, Digital is answering your need for networking products that work across all the most popular platforms, protocols, and media. Today, our networking products are targeted for the open, worldwide information technology market. These products include:

- NICs that support NetWare, LAN Manager, Microsoft, SCO UNIX, and VINES servers as well as PATHWORKS products
- · Access routers that support industry standards such as Open

Shortest Path First (OSPF), integrated Intermediate System to Intermediate System (IS-IS), and Interior Gateway Routing Protocol (IGRP) for Cisco environments

critical networking

complex your multi-

vendor computing

environment. If

you're imagining

Digital, you're right.

no matter how

- · Hubs that support Token Ring as well as Ethernet and
- High-performance, reliable backbone routers with leadership TCP/IP performance
- High-performance multi-gigabyte FDDI switches

All of these are manageable through HUBwatch, Digital's network management application, as well as through a broad range of other vendors' network management packages utiliz-

Digital's networking product strategy is complemented by our growing relationships with business partners such as Merisel, Gates F/A, and Anixter - partners that add their own brand of expertise as we expand our networking family

What's more, Digital will introduce ATM capability that is compatible with existing LAN technologies. By integrating ATM products into Digital adapters, hubs, and switches, we assure you a seamless growth path for your computing environment.

In short, Digital is taking steps to protect your current technology investments while giving you the freedom and flexibility to meet future business goals.

For more information on any of Digital's family of networking products and services, call 800-DIGITAL (800-344-4825) and reference code BFE. ■

Introducing

The DECbrouter 90 **Multiprotocol Bridging Router**

Whether your organization needs to connect local area networks (LANs) or build a backbone-based, enterprisewide network, Digital's family of multiprotocol routers offers the functions you need most. And the latest addition to the router family is no exception.



Digital and Cisco Systems, Inc., have teamed to create a product that is truly unique in its capabilities. Called the DECbrouter 90 multiprotocol bridging router, it's the only bridging router today that provides routing protocols such as IS-IS, OSPF, and IGRP on a single platform. The result? True multivendor interoperability between Digital and Cisco products. In fact, Digital is the only router vendor that offers Cisco router interoperability.

DECbrouter 90 bridging router provides remote access for Ethernet devices across a wide area network (WAN) - utilizing a broad range of network and routing protocols. This delivers sophisticated and lowcost LAN internetworking to a greatly expanded base of users.

The DECbrouter 90 bridging router works as a true standald bridging router or as a module within Digital's DEChub 90 or DEChub 900 products. That means you get the flexibility to purchase what you need today - with assurances that these investments will be protected well into the future. Other members of Digital's access router family

- Network Access software and hardware including DECserver products, for laptop and dial-in environments
- EtherWORKS router for PC LAN connectivity
- DECwanrouter 90, for lowest-cost remote office routing requirements

PRODUCT	ORDER NUMBER	PRICE
ACCESS ROUTER FAMILY		
EtherWORKS Router	DE206	\$1,200
DECwanrouter 90	DEWAR*	\$1,855-\$1,990
DECbrouter 90	DEWB*	\$3,240-\$4,350
ASYNC DIAL-IN NEEDS		
DECserver 90m	DSRVH*	\$1,755-\$2,200
DECserver 700	DSRVW*	\$2,800-\$3,295

requirements. Call 800-DIGITAL (800-344-4825) and reference code RFF for detail

The following are trademarks of Digital Equipment Corporation: Alpha AXP, AXP, DEC, DECb DEChub, DECnsr, DECsystem, the DIGITAL logo, EtherWORKS, HUBwatch, OpenVMS, PATHWORKS, POLYCENTER, StorageWorks, ULTRDX, VAX, VAXcluster and VMS. DISKEEPER is a registered trademark of Executive Software, Inc. Hewlett-Packard is a registered trademark of Hewlett-Packard Commi IBM is a registered trademark of International Business Machines Corporation. Intel is a trademark of Intel Corporation, NetWare is a registered trademark of Novell, Inc. OSF/1 is a registered trademark of Open Software Foundation, Inc. PICK is a registered trademark of Pick Systems. SCO is a trademark of Santa Cruz Operations, Inc. Sun is a registered trademark of Sun Microsystems, Inc. UNIX is a registered trademark of UNIX System Laboratories, Inc. Synergy Application Development Environment is a trade mark of Digital Information Systems Corporation. VINES is a registered trademark of Banyan Systems Inc. Windows $N\Gamma$ is a trademark and Microsoft and MS-DOS are registered trademarks of Microsoft Corporation. Listed prices are U.S. Manufacturers' List Prices and are subject to change

PUTTING IMAGINATION TO WORK

Hired to hack

Companies hire the Price Waterhouse team to hack into their systems and evaluate weak links

By James Daly

If you want to know how strong a lock is, try to crack it. How well-built is that rope? Run a strength test.

The same principles hold true for information systems security, where a whole range of people are ready to hack into your system and tell you where the weak links are.

Among the most widely respected security experts is a team at Price Waterhouse's Management Consulting Services, which for the past few years has engaged in what are known as "Data Security Penetration Studies." Business has been good, said partner Jonathan Harris, because as networking spreads, so do a system's vulnerabilities.

"People are going after your system every way imaginable: dedicated lines, public phone systems, local on-site terminals," he said.

The Price Waterhouse team is a sort of do-it-yourself hacker unit. Comprising three or four people, the team attempts to penetrate computer environments by going over, under and around every security system you throw at it.

Although the team is typically hired by systems secu-

rity, many times it is brought in at the behest of a senior executive. The computer department will not be told of the pentration study in advance. "It keeps people on their toes," Harris said.

Harris said the "hired hackers" approach the task on four levels: as outsiders with no company information; outsiders with some company information (such as an ex-employee bent on destruc-

tion); insiders with no company information; and insiders with standard company application programmer access.

The penetrators do not actually sport criminal records because clients are typically uncomfortable with that idea, Harris said. They are full-time Price Waterhouse employees. "We don't use stringers," Harris said. "The work is too sensitive, and we can't let that sort of knowledge get outside of our company."

A typical study by Price Waterhouse includes carefully designed security penetration activities of selected mainframe, midrange and desktop environments. Fees range from \$40,000 to \$120,000, and the study can take anywhere from two to eight weeks, depending on the

attack scenarios and the number of sites involved.

Although each study is unique, Harris said he finds the same weak links in many sites. "It's usually pretty easy to get into a LAN because so many people use easily guessed passwords or the default password," Harris said. "And most LANs contain gateways into other envi-

ronments. So once you're in, you have the keys to the kingdom."

The service conducts reviews of current security practices and then recommends a security plan. Upon completion of the study, Price Waterhouse provides the client with an evaluation of the level of information available to a potential hacker as well as the security measures that should be in place.

Such systems penetration services from established firms have drawn the derision of ex-hackers who have gone straight and provide similar services.

"These guys are not out there playing in the keyboard jungle day in and day out," said Ian Murphy, an ex-hacker who provides a security penetration service as president of IAM/Secure Data Systems in Norristown, Pa. "They get all their tips from manuals and briefings. They're not out there going through dumpsters, chatting on the hacker bulletin boards and getting the real story on what's yulperable like we are."

Not true, said Harris, who claims his team is skilled in even the most minute technical details. "The main question you want to ask with any service like this is, 'Do you trust these people?"

HP readies Image/SQL indexing

By Mark Halper

■ Hewlett-Packard Co.'s database group last week outlined modifications to its Image/SQL database that will accommodate a highly desired indexing feature for the proprietary database.

But that feature will not be delivered for a year, and users will have to wait for other improvements they hope to see in the database. These include a Data Description Language (DDL) that would give the hierarchical database more of a relational feel. DDLs permit users to restructure data sets without unloading and loading data.

In the meantime, Jim Sartain, Image/SQL laboratory manager, said HP is modifying the database so that b-tree indexing programs from Dynamic Information Systems Corp. in Boulder, Colo., and Bradmark Technologies, Inc. in Houston work with the database's SQL interface. The company will, however, stop short of actually bundling a b-tree feature into Image/SQL.

B-tree indexes slash the time it takes for users to exceute generic searches in a database, such as when looking for all mentions of a particular town that may be scattered throughout voluminous records.

Until the new software is delivered, Bradmark's and Dynamic Information Systems' b-trees can use only a more traditional interface, effectively nullifying the SQL implementation of the database and relegating users to flat-file queries, Sartain said. That will be fixed.

Users have voiced a strong interest in b-tree indexing for Image/SQL. SIGimage, a special interest group related to the HP user group Interex, declared the b-tree feature its top request during a conference in Birmingham, England, last summer.

Image/SQL, formerly known as Turbolmage, was written exclusively for HP's HP 3000 multiuser system and that machine's MPE-IX operating system.

Last December, HP announced it was

Trying to please

week if they would like

Image/SQL on the HP

9000 Unix platform -

a move that would

accounts migrating

from the HP 3000 to

Unix. HP estimated

that Image/SQL is

HP 3000s, which

number 55,000. It

declined to estimate

the installed base of

its Allbase database.

which it sells for its HP

oooo Unix system and

also for the HP 3000.

Some users said they

think HP will combine

the two offerings.

loaded on all installed

help HP retain

HP asked users last

taking a large step toward making Turboimage relational by adding SQL to the program [CW, Dec. 14, 1992]. That move pleased HP 3000 users who had long complained that HP was offering a relational database, called Allbase, to HP 9000 Unix users while neglecting the relational needs of HP 3000 users.

Image/SQL is currently in beta sites, where users are implementing DDLs from third-party suppliers including Adager Corp. in Sun Valley, Idaho, Dynamic Information Systems and Bradmark.

Adding a DDL to Image/ SQL is one of several enhancements that HP has "under consideration," Sartain said. HP is also looking into providing on-line backup routines, support for binary large objects and twophase commits, he said. The company plans to poll users' interests at the Interex conference.

Wirt Atmar, president of AICS Research, Inc., a University Park, N.M., Image/SQL report writer vendor, pointed out that if HP is to rightfully claim Image/SQL as a relational database, it must add an intrinsic DDL to the program.

"People have confused the word relational and SQL," he said.

Ken Sletten, project engineer at the Naval Undersea Warfare Center in Keyport, Wash., observed, "Right now, you can't add an index or drop an index on the fly—basically, you can't manipulate the structure of your database on the fly."

Alfredo Rego, president of Adager, noted that even though third-party vendors provide a DDL, they do not always conform to SQL standards. For instance, Adager's DDL is not written in SQL syntax, so it uses a different command vocabulary than what SQL prescribes.

Rego said the syntax difference is minor, but he and others agreed that users want a program that conforms to SQL

Answering the call

Users praised HP for generally heeding the call of irate HP 3000 users who had complained about the firm's past failures to develop relational qualities for Image/SQL.

"HP has come a long way since the Boston Tea Party," Sletten said, referring to a 1990 Interex meeting in Boston at which HP 3000 customers staged loud protests demanding relational enhancements to Image/SQL.

Oracle chief sets delivery for Media Server

By Kim S. Nash

New versions of Oracle Corp. databases capable of manipulating video and sound are anchoring tests of interactive TV applications at Bell Atlantic Corp. and US West. Oracle's so-called Media Server products are expected to be on hand this week at International Oracle Users Week.

Experiments are in the works with Bell Atlantic and US West to bring applications such as home shopping and video on demand to homes within the telephone companies' calling areas, according to Oracle executives.

Media Server is an umbrella term for massively parallel database modules designed to handle images, full-motion video and CD-quality sound, according to Larry Ellison, Oracle's chief executive officer. Pieces of Oracle Media Server, including an object-oriented development tool kit for building interactive TV programs, are due to ship to developers in January, Ellison said.

Media Objects, which marks Oracle's entrance into object-oriented technology, also contains a real-time operating system and user interface designed to run on set-top boxes. Set tops are computer-style boxes that sit atop TVs to help home viewers navigate the interactive world.

Set-top boxes running Media Objects will be able to talk to DOS and Macintosh operating systems, Ellison said, adding that the product will require 2M bytes of disk space.

The brains behind behind Windows NT.

When Microsoft* went searching for a processor to develop Windows NT," where did they turn? To the best brains in the business.

The mighty MIPS R4400 RISC microprocessors.

Which isn't surprising, really. The NEC V_R4400° 150MHz MIPS proces-

sor is already at the heart of the most powerful workstations in the world.

And now, thanks to Windows NT, the same 64-bit brain that resurrected velociraptors in the latest Hollywood dinosaur movie can now be right on your desk. Manipulating spreadsheets. Processing data. And, perhaps, even

changing the course of history.

The reason Microsoft chose the MIPS RISC architecture is simple—raw, unadulterated speed. In fact, NEC's V_R4400 runs Windows NT almost twice as fast as Pentium, and nearly four times as fast as the 486° DX2/66°.



So before you buy a computer to run Windows NT, be sure to think about what's inside. After all, it only makes sense to choose the quickest processor that processed the program.

If you're responsible for evaluating new PCs running Windows NT, look for the new V_R4400 based systems.

They run faster, save you money and even let you use your existing DOS and Windows 3.1 software applications.

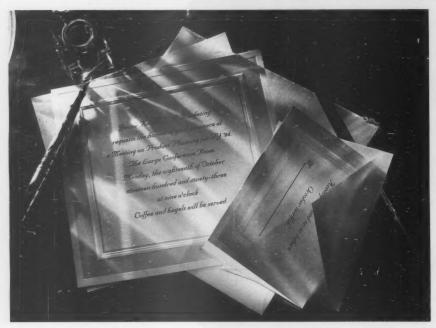
To discover more about our V_R-Series microprocessors, and to receive a list of systems vendors shipping V_R-Series based PCs, please call NEC Electronics Inc. at 1-800-366-

9782. Or fax us at 1-800-729-9288 and ask for Info Pack #167. For information on NEC MIPS-based PCs, call NEC Technologies, Inc. at 1-800-NEC-INFO.

NEC

© 1993 NEC Electronics Inc. All registered marks and trademarks are property of their respective holders. *Comparison based on bitfield Byte portable benchmarks, August 1993.

EXACTLY WHAT DO PEOPLE NEED THESE DAYS TO GET THEM TO COME TO A MEETING?



INTRODUCING ORGANIZER 1.1 WITH GROUP SCHEDULING.

If you've ever tried to pull a group meeting together you know all too well how frustrating it can be. Now Lotus OrganizerTM 1.1 Personal Information Manager for WindowsTM works across your existing ccMailTM network to make organizing a meeting – as well as organizing your day – easier than ever.

You simply choose who you want to attend from the mailbox list. Organizer shows you a graphical view of busy and free times so you can pick out the optimal meeting time. Then Organizer delivers an invitation via ccMail. Invitees can accept, decline or delegate to someone else – with a single mouse click. Organizer tracks responses automatically. No chasing people

down in the halls. No phone tag. Just the easiest way ever to plan a meeting.



Lotus Organizer with group scheduling takes the guesswork – and the footwork – out of meeting planning.

FOR LAN ADMINISTRATORS, NO OTHER SCHEDULING SOLUTION IS NEARLY SO INVITING.

For starters, Organizer uses existing ccMail directories to simplify installation. Invitations can be sent to anyone on the network even if they don't

use Organizer. And because Organizer's group scheduler displays a user's availability only, not the entire schedule, security and privacy are protected.



With an on-screen calendar, a to-do list, an address book a note pad and an anniversary reminder built into one package. Organizer is a powerful personal tool that's fun to use.

Both Organizer and ccMail have exceptionally friendly Windows interfaces – help calls are minimal, and your life is made a little easier.

ORGANIZER DOES MORE THAN PLAN MEETINGS.

Organizer 1.1 includes all the personal management tools that made Organizer 1.0 the best product of its kind for Windows. Essentially, Organizer is a day planner – a really smart day

planner with the ability to link related tasks, names and phone numbers. It is an onscreen calendar, a to-do list, an



address book, a note pad and an anniversary reminder, all rolled into one. Organizer will even sound an alarm to remind you of a commitment – like that meeting you're invited to.

Find out more about how Organizer could work for your organization call **1-800-872-3387**, ext. **9163**, or visit your Lotus Authorized Reseller. No invitation necessary.



COMPUTERWORLD

Annual Consultants Directory

for 1994 INFEGRAFED SOFFWARE SPECIALISTS

Leading the Integration Of Strategic Technologies for Business Process Re-Engineering

Strategic Technology

A technology that corporations cannot ignore if they want to be competitive in the future.



- Leverage the most advanced technologies to support your business process re-engineering efforts
- Maximize your investment in existing systems with the latest re-engineering and maintenance technology
- Migrate existing software systems into a client/ server environment or to different platforms
- Reverse-engineer your existing systems into a repository-based development environment

Business Process Re-Engineering

A fundamental change in business processes with consideration given to how technology can boost productivity and competitiveness.

ISS Specialities

Management Technologies Division

Data Warehouse Quality Metrics Strategic Planning

Knowledge Engineering Division

AI Technologies Knowledge Based Systems Neural Networks

Re-Engineering Division

Software Migration & Right Sizing Reverse Engineering Technologies Forward Engineering Technologies

Distributed Systems Division

Client Server Development Graphical User Interfaces Object Oriented Development

Image Management Division

Document Image Management & Systems Integration Imaging & Workflow Solutions OCR & ICR Integration

Rest In Class

Dedicated to Decreased Cycle-Time, Improved Quality and Reduced Cost

TEL: 708 240 5070 FAX: 708 240 5073

1701 East Woodfield Road Suite 911 Schaumburg, IL 60173 Call ISS today and find out why our customers refer to us as "partners".



Welcome

Computerworld Product Classified Advertising Staff 800 343-6474

Connie Martin Kearins Telemarketing Sales Manager

Ted McNulty Sales Supervisor

F. Jay Savell Account Executive

Nancy Whittaker Sales Assistant

Cindy Delany Production Director

Colleen Garland Production Supervisor

Peter M. Kelly Designer to Computerworld's Second Annual Consultants Directory for the Information Systems Environment. Computerworld is pleased to bring you, the Computerworld reader, this special directory of consulting and professional services organizations.

You'll find plenty of valuable products and services.

The solutions providers that appear in this new directory have contacted Computerworld directly and have paid for their appearance so that they may hear from readers like you: professionals who they consider to be key users of their products and services.

Please save this directory for future reference.

Or pass it along to someone who might also find it useful. We've designed this special directory for you to use now and into the future. To gain the maximum value, please page through it to see the various specialty classifications that appear alphabetically.

There's a State & Specialty index.

Indexs of all products and services described in the directory appear on pages 11 and 15.

We're pleased to offer The Consultants Directory to our readers and hope you find it useful in your business endeavors!

Accounting/Payroll

Phase II Software/Cons, Inc. (800) 653-4536

(800) 653-4536
10+ year specialists in Dun & Bradstreet Millennium products; also offers RACF/ACE2/TOPSECRET extended security interface sys. Call/write Tom Busch, Phase II Cons, Inc. 21 N. Garden St., Cumberland, RI 02864

Support Strategies Consulting

See our ad on this page



A MEDIUM IS ONLY PRIMITIVE IF IT DOESN'T GET THE MESSAGE ACROSS

Origin Technology In Business, Inc. is a leading international is a leading international consulting firm in the field of information technology, managing both national and inter-national projects through 85 offices in 14 countries.

Though we work at the cutting edge

Though we work at the cutting edge of technology, we don't dismiss the conventions and methods of other or older cultures as primitive. What's important isn't how modern our methods are—it's whether they're effective. And how they relate to the culture in which they're used.

That's why, when we take on an

That's why, when we take on an assignment, we care about the 'how' as much as the 'why'. In this way we can find original answers for the automation problems you've asked us to solve.



ORIGIN TECHNOLOGY IN BUSINESS

Origin Technology In Business, Inc. North American Headquarters 1105 Schrock Road, Suite 816 Columbus, Ohio 43229 TEL 614 431-2345 FAX 614 431-3514

Applications Development

ADIA Information Technologies (800) 626-8082

(800) 626-8082
We are a national management and applications development consulting firm with a strong presence in over 50 cities and in virtually every industry. We are committed to providing our fortune-listed clients with a full range of services that include applications development, project management and technical support. Contact Gale Heritage, Director of National Marketing, 210 West Pennsylvania Ave., Ste. 650, Towson, MD 21204. Fax (410) 828-0106.

Analysts International Corp

(800) 800-5044

(800) 800-5044
AIC is a recognized consulting firm with over 35 locations providing a wide range of information systems expertise to Fortune 500 clients. Services include contract programming, business application development, client server applications, GUI, help desk and maintenance outsourcing, project management, and technical writing. AiC, 7615 Metro Blvd., Minneapolis, MN 55439-3050.

DATAVANTAGE, Inc.

(800) 879-3108

(800) 879-3108 Custom applications development, expertise in manufacturing, inter-compa-ny networking, and marketing systems. MIXMATCH utility product. P.O. Box 442, Milford, CT 06460.

James R. Borta & Associates, Ltd.

(708) 882-1301

Specializing in application development for PC and Mainframe. Expertise in Nomad and Oracle. For more information call/write Jim Borta, James R. Borta & Associates, Ltd., 1565 Jefferson Rd., Hoffman, IL 60195-3518.

SUPPORT STRATEGIES CONSULTING

We specialize in providing strategic solutions to the use of Mainframe Application Software Packages through:

- Requirements Analysis
 File Conversions
 Implementation
 Interfaces to related Software
 Development of customized User
 or Industry-specific Software
 Training & Documentation

Specific expertise in:

- DBS M:Series Applications & Tools
- Public Utility Accounting & Software
 Fixed Asset Tax Accounting
- Sales and Use Tax
 PC & Mainframe Packages



Call 1-800-233-7151

Thomas Holland and Assoc. Inc. (800) 508-4359

(800) 508-4359
"Big 6" experience without exorbitant rates! We specialize in developing OOP applications for Windows using Smalltalk V and providing JAD facilitation and project management services.

TOKINO Technologies

(914) 278-3115 FOR THE BUDGET CONSCIOUS MANAGER: 30% savings on superior turnkey develop-ment and contract consulting solutions with Sybase/ Oracle (V6/V7) / Informix / Ingres / UNIX/C/C++. Specialists in Client/Server, CASE, "rightsizing" initiatives.

Origin Technology

See our ad on this page

Quincy Street Corporation

(602) 381-0096

Engineering, data processing, or opera-tional problems solved. Systems integra-tion, DBMS, Object-Oriented Programming, ATE, VAX, UNIX, training. Kirk Thompson, 2701 E. Camelback, Suite 205, Phoenix, AZ 85016, FAX (602) 957-6741.

Banking

Bank Consulting Services

(216) 328-2115

(216) 328-2115
A professional service organization providing consultants, contractors, and fulltime personnel for the banking industry.
For more information call/write 6450
Rockside Woods Blvd., S., Suite 100
Cleveland, OH 44131.

Quatrix, Inc.

(314) 434-6655

(314) 434-6655 Specialists in Banking/Lending Systems. We offer quality support for Datalink and CPI Mortgage Systems, Shaw Consumer, ACAPS, AFS Commercial, Hogan and Customer Interfaces to other Ancillary Banking Systems. Offices in St. Louis, Dallas, Los Angeles, and Phoenix. Call/write: Quatrix, Incorporated, 12977 North Outer 40 Drive #30, St. Louis, MO 63141-864. 63141-8643.

Business Reengineering

Axiom

(415) 398-3484

(415) 336-3464
National firm creates competitive advantages for clients by redesigning business operations to support changing strategies.
Utilizes innovative method, Business Renewal, to ensure rigor and repeatability.

CASE

Corporate Consulting Group

(713) 521-2999
Specializing in applications development using Texas Instruments; IEF CASE tool. For more information contact Earle Page, CORPORATE CONSULTING GROUP, 3120 Southwest Frwy, Houston, TX 77098.

Keefer Consulting Inc

(215) 246-3407
Business area analysis, Process reengineering, Data and Object-oriented modeling; Ken Keefer has 15 years IS experience, 8 years CASE training, methodology, and standards development; Bachman, Knowledgeware, Oracle.

Montare International

See our ad on this page

Seer Technologies

See our ad on page 7

CASE/ADW

Martin Consulting Corp.

(407) 951-0934 FAX 407-951-2722 Specialists in Information Engineering training & consulting for KnowledgeWare ADW 2.7, JAD, TPF/ACP. Information systems planning through implementation. O-O & real-time modeling.

Client/Server

ESCA Incorporated

(312) 346-0444
Specializing in Client Server design, development, and training to meet the information technology needs of your business. Extensive experience with PowerBuilder, Visual Basic, Visual C++ and Sybase/SQLServer.

Greenbrier & Russell

See our ad on this page

Information Technologists, Inc. (800) 296-4600

(SUU) 290-490U, Specializing in Client Server integration, Consulting, & Training, Microsoft University classes, Premier Power Channel Partner, Microsoft Solutions provider. Lotus Notes, Lotus Authorized Education Center.

Kenda Systems, Inc.

See our ad on this page

Patricia Seybold Group

(617) 742-5200

(GT) 1742-5200 Comparative analysis and strategic plan-ning in client/server computing, applica-tion development tools, open systems, groupware, objects, and DBMS. For more information please call Donna Cheney in Boston, MA.

Vital Technologies, Inc

(415) 348-4848

(415) 348-4848 Generalist and Systems and Technical Architecture Consulting, Specializations include client/server computing in a multi-vendor environment and data warehouse development. Author of Apple Computer's VITAL.

COBOL

Pierce Associates

(617) 492-1638

(617) 492-1638
Specializing in the rehosting & downsizing of Minicomputer and Miniframe Cobol applications to client/server applications on Novell Networks. MICROFOCUS Cobol and Novell's Btrieve File system are the primary tools used for conversions. Experienced in the redesign and rehosting of databases up to 2GB in size. Contact Roger Pierce, Pierce Associates, 261 Lake View Ave., Cambridge, MA 02138.

KENDA Systems, Inc.

IT Consultants

MAINFRAME ● CLIENT SERVER SYSTEMS and APPLICATIONS ONE CALL PROVIDES ACCESS TO ALL

1.800.ie.KENDA

ONE STILES ROAD SALEM, NH 03079



ber NACCB

NAT'L . NY . MA . DC . UK



Competitive Intelligence

Nahmias & Company

(203) 249-7079
Management consulting and research, including competitive intelligence, business reengineering, and strategic planning. Contact Rich Nahmias, CityPlace, 31st Floor, Hartford, CT 06103.

Things Change

You knew us as Titan Consulting Services, Inc.

But things have changed.

We have a new name to reflect our diversity of products and services.

And a new address to reflect the growth we've experienced.

In fact, the only thing that hasn't changed is our commitment to provide you with the highest quality in:

- ☐ Information Engineering/IEF Training and Consulting
- ☐ Client/Server Development and Implementation
- ☐ Business Process Re-Engineering
- □ ADW Consulting
- ☐ Development Coordination
- ☐ Encyclopedia Management.

The world of information is ever changing. Today's advancement may be next year's faint memory.

Montare helps you turn change into profit.

Call today.



15303 Dallas Parkway • Suite 1060 LB 22 • Dallas, Texas 75248 214 / 458-9430 • Fax 214 / 458-9447

Contract Programming

Avalon Solutions, Inc.

(508) 520-1711
Development and consulting for InterBase, Paradox, C/C++, Basic, DOS, Windows, UNIX, PRO-IV. PICK, COBOL conversions. Application and database integration and interface development. Competitive rates. On/Off-site. FAX (617) 484-5423.

The Right Mindsat The Right Time

Information Systems & Telecommunications Consulting Services

MINDBANK offers full life-cycle development application and professional staffing support services to commercial, defense & government service nationwide.

Centers of Expertise include:

- CASE and Reengineering
- UNIX-based Systems
- · Proposal Development
- LAN/WAN Design
- Client/Server Systems
- Database Development
- · Workflow Applications

VAR for CA-UNICENTER /UNIX GSA rates available. Extensive IEF capabilities.



MINDBANK CONSULTING GROUP

8500 Leesburg Pike, Suite 7800 Vienna, VA 22182-2409 703-893-4700 1-800-444-2234 FAX 703-761-3038

Axis Consulting International, Inc.

(415) 434-2947 Offices in the USA, UK, and Australia. In-Offices in the USA, UK, and Australia. In-ternational database of consultants, including expertise in UNIX, Ingres, SYNON, Networking and Client/Server. 690 Market St., Suite 1100, San Francisco, CA 94104. FAX 415-434-2951.

Computer Extension Professionals

Computer Extension Professionals 803/738-2782
CEP, Inc. is a leader in contract computer staffing resources for HP MPE, MPE-XL and HP-UX shops. Our personnel range in responsibility and skill from Computer Operations to Programmer/Analysts to Project Managers. Software expertise includes COBOL, Image, View, PowerHouse, Speedware and Uniface. CEP, Inc., PO Box 61114 Columbia, Sc, 29260.

Comsvs

See our ad on page 10

Mindbank

See our ad on this page

NACCB

See our ad on page 16

TechniSource National

800-940-1111;FAX 305-493-8603 ouv-940-1111; PAX 305-493-8603 The right people, The right skills., guaranteed. 1901 NW 62St, #401 Dept. CW, Ft. Lauderdale, Ft. 33309. 407-332-8988, Orlando, 813-576-1433, Tampa, 708-887-1090, Chicago.

Yoh Information Services

(408) 956-1611 Fax (408) 956-0446 (AUS) 9305-1011 FaX (4US) 930-0440 With over 50 yrs. of staffing experience, we provide Information Services Contractors for all areas, discipline, and specialities: DB Admins, programmers, SW developers, SW Engineers, System Admins, System programmers, etc...

HTR

Authorized certification paths: Novell, Microsoft, Lotus Notes, SunSoft, SCO

Customized course development

Certified instructors

On-site training delivery

Drake testing facility

Offices nationwide (800) 882.6420 TECHNICAL EDUCATION SPECIALISTS

DBMS

HCL America, Inc. (408) 733-0480

(AUG) 733-U400 Full-range database consultants emphasizing rightsizing to client/server systems for UNIX and Windows. Special skills with Sybase and Oracle, also PowerBuilder and UnifAce. Over 250 full-time consultants, Performance tuning a specialty. Banking, Insurance, and Manufacturing solutions experts. Also offer conversions and reengineering through out low-cost offshore facility. Call for references from our F500 clients.

Intelligent Information Systems.Inc.

(919) 870-9356

Specializing in converting legacy applica-tions to Oracle. We have comprehensive tools & methodology for low cost, risk-free conversions. Expertise in Oracle tools, DBA and Performance Tuning. Fax 1-919-870-5346.

OMNItech Consulting Services,

(908) 225-5577

Nationally recognized staff specializing in ORACLE and CA-DATACOM/DB applications programming, database design and administration, system tuning and sup-port. OMNItech Consulting Services, Inc., Raritan Plaza 1, Edison, NJ 08837.

Database Consultants

Steven A.Gardiner Consulting, Inc.

Steven A.Gardiner Consulting, Inc. (612) 476-0256 CA/IDMS/DB/DC - Expert database administration and technical support for IDMS databases and related software. Twelve years experience with IDMS. For more information, please call Steven A. Gardiner Consulting, Inc. - voice / fax (612) 476-0256.

Data Warehousing

Continuum Consulting, Ltd

(800)-999-4829

Continuum's highly experienced staff pro-vides expert guidance, training, and assis-tance in implementing the data warehouse concept on open systems platforms. Call us toll free for more information.

Desktop Publishing

THEATRICKS, Inc.

(404) 928-3298

(404) 928-3298 Windows and OS/2 software consulting, design, and development. Desktop design, presentations, and publishing services. THEATRICKS, Inc., 1037 Summer Place, Acworth, GA USA 30102.

Disaster Recovery

Raymond Professional Mgmt., Inc.

Raymond Professional Mgmt., Inc. (800) 682-3439 Independent Consulting. Recognized Authority Worldwide. Specializing in Disaster Recovery Plans, Corp. Cont. Plans, Records Mgmt., Security, Client Server Plans, Network Services, Voice Communications, Risk Mgmt., and Auditing

SOFTWORLD Corp.

(407) 995-8436 An OS/2 full service company providing: Development, Consulting & H/S Solutions. Specializing in: client/server, SQL, D82/2, C++m GUI-PM, CM/2, APPN and LAN Server.

E-Mail

CompLink Ltd. (516) 829-1883

(516) 829-1883
CompLink Ltd., a network communications consulting firm specializing in desktop automation and gateway products for the LAN and PC environments. In addition to its powerful WorldLink communications products. CompLink offers complete consulting, installation and training services. Our professional consultants are available to assist with: Electronic Mail Connectivity Multimedia Integration LAN Connectivity Design and Implementation Application Conversion Services

EDI

DNS Associates, Inc. (800) 624-6354

(800) 624-6354 Specializing in EDI translation software and services. EDI/ENTRY and EDI/EDGE support all standards and networks, for stand-alone work station and/or front-end processor operation - for MS-DOS, UNIX and LAN.

Education/Training

Boytan & Associates

(508) 635-9819

(506) 035-9819
Specializing in technical and non-technical training solutions and educational consulting services for the IS function. 40+ years of experience! Contact BoyTan & Associates, 5 Old Meadow Lane, Acton, MA 01720.

The Dublin Group

(415) 227-4777 Ext. 7033 Specializing in Systems Implementation pecializing in Systems implementation, Reengineering / Reskilling, Sales Performance. Focus is user acceptance and productivity. Expertise in analysis and planning, change management, training and documentation.

HTR

See our ad on page 6

ACCOMPLISH MORE AS A SEER CONSULTANT

Our consultants have earned Seer Technologies an international leader-ship position in modern systems development.

Gevelopment.
Seer's elite consultant group utilises the Seer's HPS Environment to automate the entire systems development lifecycle. Maximize your creative potential with this integrated set of CASE tools that facili-tates large-scale cooperative processing and supports some of the world's largest client/server applications.

Seer, a joint venture of IBM, First Boston and our employees, offers a challenging career environment to exceptional information systems professionals. For more information, please contact:

National Recruitment Manager, Seer Technologies, Inc., 8000 Regency Parkway, Cary, NC 27511.



PRICE WATERHOUSE CONSULTING CHANGE INTEGRATIONSM & INFORMATION TECHNOLOGY

Our CHANGE INTEGRATION methodology has helped many companies realize dramatic improvements by dealing in an integrated manner with all DELIVERING aspects of change:

- culture and people
- structure
- systems and processes
- technology

Systems using advanced technology are typically a central element in realizing the **BASED ON** benefits of change. We are in the business of DELIVERING TECHNOLOGY

BASED ON SOLUTIONS TO BIG PROBLEMS.

We are unsurpassed in the way we combine: **SOLUTIONS**

- industry.
- application and
- technical knowledge

while working effectively in YOUR culture and environment. Give us an opportunity to tell you about our client successes. Please refer to state/specialty indexes

for your local Price Waterhouse consulting office.

Price Waterhouse



TO BIG

TECHNOLOGY

Education / Training cont'd

Gabrielle & Associates

C214) 690-0370
DB2 physical design & tuning consulting and courses for design & development for performance since 1984 for 10,000 DB2 professionals in the USA & 23 countries.

Experimental Designs

Szonyi Associates

(617) 862-8385 Specializing in optimizing experimental designs and data analysis. Call/write Geza Szonyi, 177 Cedar St., Lexington, MA 02173.

Expert Systems

Intergrated Software

Specialists, Inc. See our ad on page 2

VANGUARD

VANGUARD's RACF Administrator®

(VRA) is the problem-solving software for security administrators, auditors and managers.

Call now for more information..

VANGUARD Integrity Professionals 180 South Anita Drive Orange, CA 92668 Phone: 714-939-0377 Fax: 714-939-0273

FAX Integration

Stadnik & Company, Inc.

Goay 547-2000
We offer "enhanced fax" integration services to help you build fax into you paptications. Extensive experience enabling fax on a variety of platforms including IBM, DEC, and UNIX mainframes/servers, and with stand-alone and host-connected fax-on-demand and fax-broadcast systems. Specific exper-tise in the brokerage, technology, pub-lishing, distribution, financial, ad chemi-cal manufacturing industries.

Government

MMA Consulting Group, Inc.

(617) 426-8049

(617) 426-8049
Independent consultants to local/state governments. National practice covering all specialities. Feasibility, procurements, sys. reviews. Please contact Sheldon S. Cohen, VP, 60 Temple Pl., Boston, MA 02111.

SYSTEMS INTEGRATION & CONSULTING SERVICE

EXPERTISE IN:

 ORACLE • WINDOWS NT UNIX OBJECT ORIENTED

TECHNOLOGIES · PICK

Phone: 1-800-594-0201 Fax: (915) 584-2160

IBM

Vanguard Integrity Professionals

See our ad on this pag

Lotus Notes

Applied Systems Company

(410) 889-9213

(410) 889-9213
Lotus Notes work flow applications, APIs, with Visual Basic interfaces. Management consultant and developer all in one. For information, call Gary Sullo. Below market rates. All locations.

MCBA

Systems Design & Services, Inc.

(708) 894-1674

Specializing in support, enhancements, upgrades, conversions. Established 1982. All applications, releases, versions, languages, and operating systems. Call 708-894-1674.

Management Consulting

Deloite & Touche

See our ad on page 9

Price Waterhouse

See our ad on page 7

Manufacturing/CIM

Ainsworth Technologies Inc.

(416) 751-4420

(416) /51-442U
Creating & applying technologies that enable clients to improve their quality, productivity & competitiveness. Expertise in the fields of information, communication & control technologies. Contact Kimberley Blease, Marketing, 120 Bermondsey Rd, Toronto, Canada. M4A1X5

Multimedia

Adam Charles Consulting

(313) 482-1600

(313) 482-1000
Why not use the source that Microsoft uses? We put the Windows Resource Kit online. Multimedia Viewer and WinHelp specialists; CD-ROM and diskette distributables.

ALICOMP, INC.

The "Boutique" of the Computer Services World

Outsourcing Consulting Services:

- Data Center Operations Applications Development
- Transitional Downsizing Systems Programming Services •CLIENT/SERVER Design & Administration

"OUR PLATFORM IS EXCELLENCE"

Serving Clients Since 1980 Two State of the Art Locations: 20,000 sq. ft. Manhattan complex 100,000sq. ft. Secaucus, NJ complex

(212) 886-3600 (800) 274-5556 Fax (212) 691-2962

Networking

Computer Communication Company

Company
(800) 638-5625
Specializing in all forms of networking including local area, wide area, and dial up. CCC provides highly skilled professionals delivering services such as: needs analysis, technology assessment, network management, performance tuning, network trouble shooting, documentation, workflow automation, image processing, cable plant design, reengineering and outsourcing. A top LAN systems integrator, CCC brings 10 years of expertise with Netware, Unix, Windows, etc.

Networking Solutions

(212) 321-1999

Networking Solutions provides consulting support for computer communications network planning, design, installation and training. Technologies include LAN/WAN, packet switching, structured wiring and connectivity for micros, minis and mainframes

ORACLE

Database Technologies, Inc. (508) 443-2580

(508) 443-2580
Highly accomplished and acclaimed consultant with an average of over 7 years of ORACLE experience. Custom application and database design. Development using Oracle tools, Uniface, SQR, etc. Training for programmers, DBAs, and end-users. Specialized services include Team O.P.T.I.M.A.L. performance tuning task force, and DB CARE DBA outsourcing. ORACLE lets you dream... Database Technologies makes it come true! FAX: (508) 443-2587.

Outsourcing

Advanced Data Management

(800) 962-4377
Document DATABASE Tool for the Professionals. We have VAR and Dist. programs available. Call/Write 15 Main Street, Kingston, NJ 08528.

Litton Computer Services

Litton Computer Services
(800) 752-6527
We offer a unique blend of business and technical knowledge to support your information needs including data center management, network management and operations, software application support and development, systems development and integration, and facilities management. It is our aim to provide you with the information systems tools needed to maximize your business processes and meet your demand for information.

Alicomp, Inc. See our ad on page 8

PowerBuilder Training/ Consulting/Development

PowerCerv

See our ad on this page

Security Software

VANGUARD Integrity Professionals

(714) 939-0377
VANGUARD's RACF Administrator®
(VRA) is the problem-solving software
for security administrators, auditors and
managers.VANGUARD Integrity
Professionals (714) 939-0377 or FAX: (714) 939-0273

Systems Integration

BASIS, Inc.

(510) 547-5900.

The open-systems integrator for 12 years. A VAR for Sun, HP, IBM, Informix, Oracle and Sybase. Database design, multiprocessing servers. Serving all sectors. (510) 547-5900.

JPN

See our ad on page 8

Staffing Management

Alternative Resources Corporation (ARC)

(708) 317-1000
Information Technology Services
Company providing staffing solutions to
Fortune 1000 companies nationwide.
Contact Sue McCormick. 300 Tri-State
International, Lincolnshire, IL 60099.

CERTIFIED PUBLIC TRAINERS APPLICATION DEVELOPMENT SYSTEMS INTEGRATION CONSULTING

POWERTOOL - Libra

RESPONSE



INFORMATION TECHNOLOGY CONSULTING

WE LISTEN, WE DELIVER

Deloitte & Touche information technology professionals bring a balance of business acumen, technical expertise and broad industry and functional experience to consulting engagements. The results: well-conceived, workable solutions to business challenges.

Using the insight and perspective gained over the years, our consultants work in concert with clients to define and implement technology that serves today's needs—and tomorrow's business agenda. They can assist you with:

- · Business process reengineering
- · Strategic information system planning
- Systems integration
- · Client/server implementation
- Telecommunications
- · Emerging technologies
- · Information protection

For more information, call or write William Atkins, Deloitte & Touche, Ten Westport Road, Phone: 203-761-3361



Telecommunications/ Networking

Peek & Associates, Inc. (503) 642-2727

tious) 642-2727
Specialists in technology assessment, management and integration of advanced computing and telecommunication technologies (FDD), SONET, ATM, Networked Supercomputing). Call/write at 5765 SW 161st Ave, Beaverton, OR 97797.



IRC Technical Services (303) 763-9500

(303) 763-9500 Specialists in enterprise management, systems management(problem change, config), project management, proess def-inition and custom:zation of IBM's Info/Man. Contact: Gail Lindsey for fur-ther information.



Axis Consulting International, Inc.

(415) 434-2947
Offices in the USA, UK, and Australia. In ternational database of consultants, including expertise in UNIX, Ingres, SYNON, Networking and Client/Server. 690 Market St., Suite 1100, San Francisco, CA 94104. FAX 415-434-2951.

Barbary Coast Consulting

(415) 923-1676
Focused in the PICK, UNIX, and Prime markets. We offer a full range of services including; project management, system and application design, and coding. For more info contact Stephen Hichey, Barbary Coast Consulting, Suite 10, 2201 Francisco Street, San Francisco, CA 94123. 94123.

HCL America, Inc.

(408) 733-0480

(408) 733-0480
UNIXpertise from HCLA includes development of I/O drivers, MP kernel work, streams, and communications. Special expertise in porting toffrom UNIX. Over 250 full-time consultants, with groups for systems integration, software testing, and OoP. Fixed price or T&M. Our F500 clients say "outstanding job", "fullest satisfaction", and "compliments on the caliber of your employees". Call for details.



Automation & Consulting Tech. of New England.

(800) 877-6552

(800) 877-0592
Providing custom applications and management for VAX/VMS, UNIX, and DOS systems. Hardware/software installation/upgrades and training. Contact Peter Barenthaler at 1-800-877-6552.

Advanced Data Management

(800) 962-4377
Document DATABASE Tool for the Professionals .We have VAR and Dist. programs available. Call/Write 15 Main Street, King kingston, NJ 08528.

Windows Application Development

The Help Desk, Inc.

(602) 460-1926 Consulting services available for com-plete application development in Windows using Microsoft Access, Visual Basic, and Visual C++. Application inte-gration services available. Specialists in Help Desk and Customer Service vertical application consulting.



The consultants may be temporary. But we want our relationships to be permanent.

COMSYS supplies skilled computer consultants to some of the nation's leading firms. Whether it's one consultant or a team of 40, COMSYS has qualified people nationwide ready to serve you. And while their assignments for you may be temporary, we hope their performance will make our relationship with you permanent.



The right professionals. Right when you need them.

4 Research Place • Suite 300 • Rockville, MD 20850 (301) 921-3600 • Fax (301) 921-3700 • (800) 9-COMSYS

 Atlanta
 Colorado Springs
 Dallas
 Denver
 Research Triangle
 Phoenix
 San Francisco

 800-562-7882
 800-288-2667
 800-653-7636
 800-234-9454
 800-326-6797
 800-726-6797
 800-726-6797

State Index

Arizona

The Help Desk, Inc. (602) 460-1926

Quincy Street Corp. (602) 381-0096

California

HCL America, Inc. (408) 733-0480 HCL America, Inc. (408) 733-0480 NACCB

(919) 294-8878 Axiom (415) 398-3484

Axis Consulting International (415) 434-2947 **Barbary Coast Consulting**

(415) 923-1676 Basis, Inc. (510) 547-5900

The Dublin Group (415) 227-4777

Litton Computer Services (800) 752-6527 Price Waterhouse

(415) 393-8500 Price Waterhouse

(310) 396-3844 Vanguard Integrity Professionals (714) 939-0377

Vanguard Integrity Professionals (714) 939-0377

Vital Technologies Inc. (415) 348-4848 Yoh Information Services

(408) 956-1611

Canada: Ontario

(416) 751-4420 Colorado

Ainsworth Technologies, Inc.

Information Retrieval Companies, Inc.

Computer Communication Company (800) 638-5625 Networking

Datavantage, Inc. (800) 879-3108

Deloitte & Touche (203) 761-3361

Florida

Martin Consulting Corporation (407) 951-0934

Applications

Windows Application

Development

DBMS

UNIX

Systems Integration

Outsourcing

Client Server

Contract Programming

Maryland

Manufacturing/CIM

(303) 763-9500

Connecticut

Applications Development

Management Consulting Nahmias & Company (203) 249-7079 Competitive Intelligence

CASE/ADW

PowerCerv (813) 281-2990

Softworld Corporation Development (407) 995-8436 Support Strategies Consulting (800) 233-7151

TechniSource, Inc. (800) 940-1111

(800) 682-3439 Theatricks, Inc.

(404) 928-3298 Contract Programming Illinois

Business Reengineering

Contract Programming

Education/Training

See Specialty Index

See Specialty Index

IBM

Security Software

HTR, Inc. (800) 882-6420

Adia Information Technologies (800) 626-8082

Applied Systems Co. (401) 889-9213 Comsys Technical Services (301) 921-3600

Price Waterhouse (301) 897-5900 Massachusetts

DNS Associates, Inc. (800) 624-6354 MMA Consulting Group Inc.

(617) 426-8049 Automation & Consulting Technology (800) 877-6552

Avalon Solutions (508) 520-1711

PowerBuilderTraining/ Consulting/Development

Accounting/Payroll

Contract Programming

Georgia

Raymond Professional Mgmt., Inc. Disaster Recovery **Desktop Publishing**

ESCA, Inc. (312) 346-0444 Client/Server Alternative Resources Corp. (708) 317-1000 Staffing Management

James R. Borta & Associates (708) 882-1301

Development Greenbrier & Russell, Inc. (800) 453-0347 Client/Server Thomas Holland & Associates, Inc. (800) 508-4359 **Applications**

Development Integrated Software Specialists, Inc. (708) 240-5070 Expe **Expert Systems** Price Waterhouse

(312) 565-1500 See Specialty Index Systems Design & Services, Inc. (708) 894-1674 MCRA

Application

Kansas

Thomas Holland & Associates, Inc. (800) 508-4359 Applications Development

Education/Training

Application Development

Lotus Notes

Contract Programming

See Specialty Index

Government VAX/VMS

Contract Programming

CD Page 11

BoyTan & Associates (508) 635-9819 Education/Training Database Technologies, Inc. (508) 443-2580 **ORACLE** Pierce Associates (617) 492-1638 COBOL **Price Waterhouse** (617) 439-4390 See Specialty Index Patricia Seybold Group (617) 742-5200 Client/Server Szonyi Associates

Experimental Designs

(617) 862-8385 Michigan

Adam Charles Consulting (313) 482-1600 Multimedia

Minnesota

Analyst International Corporation (800) 800-5044 **Applications** Development

Steven A. Gardiner Consulting, Inc. (612) 476-0256 **Database Consultants**

Missouri

Thomas Holland & Associates, Inc. (800) 508-4359 **Applications** Development

Price Waterhouse (314) 425-0500 See Specialty Index Quatrix, Inc. (314) 434-6655 Banking

Price Waterhouse **New Hampshire**

Kenda Systems, Inc. (800) 435-3632 Client Server Stadnick & Company, Inc. (603) 547-2000 Fax Integration

New Jersey

Advanced Data Management (800) 962-4377 Outsourcing **Applied Systems Company** (410) 889-9213 Lotus Notes **OMNItech Consulting Services, Inc.** (908) 225-5577 **DBMS**

New York

Alicomp, Inc. (212) 886-3601 Outsourcing Complink Ltd. (516) 829-1883 E-Mail **Networking Solutions** (212) 321-1999 Networking Price Waterhouse (212) 819-5000 See Specialty Index **Tokino Technologies** (914) 278-3115 **Applications** Development

North Carolina

Intelligent Information Systems

(919) 870-9356 **DBMS** Seer Technologies (919) 380-5000 CASE

Ohio

Bank Consulting Services (216) 328-2115 Banking Origin Technology in Business, Inc. (614) 431-2345 Applications Development

Price Waterhouse (614) 365-9555 See Specialty Index **Price Waterhouse**

(216) 781-3700

See Specialty Index Oregon

Peek & Associates (503) 642-2727 Telecommunications/ Networking

Pennsylvania

Information Technologists, Inc. (800) 296-4600 Client/Server Keefer Consulting, Inc. (215) 246-3407 CASE Price Waterhouse (215) 575-5000 See Specialty Index

Rhode Island

Phase II Consulting, Inc. (800) 653-4536 Accounting/Payroll

South Carolina

Computer Extension Professionals (803) 738-2782 Contract Programming

Texas

JPN Associates (915) 584-3020 Systems Integration Corporate Consulting Group (713) 521-2999 CASE Gabrielle & Associates (214) 690-0370 Education/Training Montare International (214) 458-9430 CASE Price Waterhouse (713) 654-4100 See Specialty Index **Price Waterhouse** (214) 386-9922 See Specialty Index

Virginia

MindBank Consulting Group (703) 893-4700 Contract Programming Price Waterhouse (804) 648-9281 See Specialty Index

Washington

Continuum Consulting, Ltd. (800) 999-4829 Data Warehousing

Washington D.C.

Price Waterhouse (202) 256-0800 See Specialty Index

Agl. Axis Consulting International, Inc. (415) 434-2947 CA Pg 6 Origin Technology in Business, Inc. Price Waterhouse (614) 431-2345 OH Pg 4 (212) 819-5000 NY Pg 7 (212) 819-5000 Creenbride & Russell, Inc. Greenbride & Russell, Inc. Group & Greenbride & Russell, Inc. Greenbride & Russell, Inc. Group & Greenbride & Russell, Inc. Greenbride & Russell, Inc. Group & Greenbride & Russell, Inc. Greenbride & Russell, Inc. Group & Greenbride & Russell, Inc. Greenbride & Russell, Inc. Group & Greenbride & Russell, Inc. Greenbride & Russell, Inc. Group & Greenbride & Greenbride & Russell, Inc. Group & Greenbride & Greenbride & G								
Delicities Touche Cappa	Specialty Index							
Delicitia R Jouchast Carporation Carpo	4GL					(415) 434-2947	CA	Pg 6
Price Materhouse (212) 819-5000 NY Pg 7 Pg 6 Pg 5 Pg 6	Origin Technology in Business, Inc.	(614) 431-2345	ОН	Pa 4				Pg 9
Accounting/Payroll					and the same of th			
Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4	Accounting/Payroll							
Prise Compating								
Price Waterhouse								
Support Strategies Consulting (200) 233-7151 FL Pg Systems Design & Services, Inc. Pg Systems Design & Services, Inc. Pg Systems Design & Services, Inc. Pg Stratems Design & Services,							-	
Systems Design & Services, Inc.								
Alternative Training Media HTR, Inc. (800) 882-8420 MD Pg 6 Pg 5 Pg 6								
Applications Development Applications Develo		(700) 054-1074	11.	ryo	Vital Technologies, Inc.	(415) 348-4848	CA	
Applications Development	•				COBOL			
Analysts International Corporation (AlCI(800) 800-5044 MN Pg 4 CLA Pg 6 ACI 8 Information Technologies (800) 626-8082 MD Pg 4 James R Borta & Associates (800) 626-8082 MD Pg 4 L Pg 4 Complik Ltd. (516) 829-1883 NV Pg 7 Pg 7 Datavantage, Inc. (800) 879-3108 CT Pg 4 Complik Ltd. (780) 849-3108 CT Pg 4 Complik Ltd. (780) 849-3108 CT Pg 4 Complitive Intelligence Nahmias & Complinik Ltd. (780) 849-309 CT Pg 4 Complitive Intelligence Nahmias & Complinik Ltd. (780) 849-809 NP Pg 7 Pg 5 Namerical Pg 4 Pg 5 Namerical Pg 5 Namerical Pg 4 Pg 5 Namerical Pg 5 Nameric		(800) 882-6420	MD	Pg 6		(617) 492-1638	MA	Pg 5
HCL America, Inc. (408) 733-0480 CA Pg 6 Adia Information Technologies (800) 628-8082 MD Pg 4 Complink Ltd. (516) 829-1883 NY Pg 7 Pg 4 Complink Ltd. (516) 829-1883 NY Pg 7 Pg 4 Complement R Nussell, Inc. (800) 879-310 L Pg 4 Competitive Intelligence Competitive Intelli	Applications Development				Price Waterhouse	(212) 819-5000	NY	Pg 7
Adia Information Technologies Alba Information Technologies (800) 826-8082 MD Pg 4		C)(800) 800-5044	MN	Pg 4	Communication			
Price Waterhouse (212) 819-5000 NV Pg 7					Complink Ltd	(540) 000 4000	BISZ	0-7
Competitive Intelligence Nahmiss & Company Care Pg								
Greenbrier & Russell, Inc. 1000 459-0347 L. Pg 5 1						(212) 013-3000	141	ry
Contract Programming								
Contract Programming						(203) 249-7079	CT	Pg 5
District Computer Services (800) F25-6827 CA Pg 9 Price Waterhouse (212) 819-5000 NY Pg 7					Contract Programming			
Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 (212) 819-5000 NY Pg 7 Pg 8 (415) 434-2947 CA Pg 4 (415) 438-2948 CA Pg 5 (415) 438-2948 CA Pg 6					A nalysts International Corporation (A	IC)(800) 800-5044	MN	Pa 4
Price Waterhouse	Origin Technology in Business, Inc.	(614) 431-2345	ОН	Pg 4				
Patricia Seybold Group (617) 742-5200 MA Pg 5 Support Strategies Consulting (800) 233-7151 FL Pg 4 Computer Extension Professionals (800) 93738-2782 SC Pg 6 Computer Extension Professionals (800) 95738-2782 SC Pg 6 Computer Extension Professionals (800) 950-MNP Pg 7 MindBank Consulting Group (703) 893-4700 VA Pg 6 Computer Extension Professionals (800) 950-MNP Pg 7 Technicology in Business, Inc. (614) 431-2345 OH Pg 4 Computer Extension Professionals (800) 950-MNP Pg 7 Technicology in Business, Inc. (614) 431-2345 OH Pg 4 Computer Extension Professionals (800) 950-MNP Pg 7 Technicology in Business, Inc. (614) 431-2345 OH Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Technicology in Business, Inc. (614) 431-2345 OH Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Technicology in Business, Inc. (614) 431-2345 OH Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Technicology in Business, Inc. (614) 431-2345 OH Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Technicology in Business, Inc. (614) 431-2345 OH Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 The Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Pg 4 Computer Extension Professionals (800) 960-MNP Pg 7 Pg 4 Computer Extension Profession Professionals (800) 960-MNP Pg 7 Pg 4 Computer Pro		(212) 819-5000	NY	Pg 7	NACCB		CA	
Support Strategies Consulting (800) 233-7151 FL Pg 4 (914) 278-3115 NY Pg 4 (914) 278-3115 NY Pg 4 (212) 819-5000 NY Pg 7 (213) 819-5000 NY Pg 7 (213) 819-5000 NY Pg 7 (213) 819-5000 NY Pg 7 (214) 278-2715 NY Pg 4 (214) 278-2715 NY Pg 5 (214) 278-2715					Avalon Solutions, Inc.	(508) 520-1711	MA	Pg 6
Tokino Technologies						(415) 434-2947	CA	Pg 6
MindBank Consulting Group								
Price Waterhouse		(914) 2/8-3115	NY	Pg 4				
TechniSource TechniSource TechniSource TechniSource TechniSource Tokino Technologies Tokino Tech	Automation and Control							
Ainsworth Technologies, Inc. Ainsworth Technologies, Inc. Bank Consulting Services (216) 328-2115 Origin Technology in Business, Inc. (212) 819-5000 NY Pg 7 Courtrix, Inc. (314) 434-6655 MO Pg 4 Business Reengineering Axiom (415) 398-3484 Ca Pg 4 Crigin Technology in Business, Inc. (614) 431-2345 Origin Technology in Business, Inc. (415) 398-3484 Ca Pg 4 Crigin Technology in Business, Inc. (614) 431-2345 Crigin Technology in Business, Inc. (612) 476-0256 MN Pg 6 Data Warehousing Continuum Consulting, Inc. (612) 476-0256 MN Pg 6 Data Warehousing Continuum Consulting, Inc. (612) 476-0256 MN Pg 6 Data Warehousing Continuum Consulting, Inc. (612) 476-0256 MN Pg 6 DBMS HCL America, Inc. (408) 939-4829 WA Pg 6 DBMS HCL America, Inc. (408) 939-4829 WA Pg 6 DBMS HCL America, Inc. (408) 939-4829 WA Pg 6 DBMS HCL America, Inc. (408) 733-0480 CA Pg 6 DBMS HCL America, Inc. (408) 733-0480 CA Pg 6 DBMS HCL America, Inc. (415) 434-2947 Avis Consulting International, Inc. (415) 434-2947 CA Pg 6 DBMS HCL America, Inc. (415) 434-2947 Avis Consulting International, Inc. (415) 434-2947 CA Pg 6 Corporate Consulting Services, Inc. (500) 999-4829 WA Pg 6 DBMS HCL America, Inc. (415) 434-2947 Avis Consulting International, Inc. (415) 434-2947 CA Pg 6 Corporate Consulting Services, Inc. (516) 434-2947 Corporate Consulting Services, Inc. (517) 766-4000 Intelligent Information Services (518) 48-404 Avis Consulting International, Inc. (614) 431-2345 CORDOR (Avis Consulting International, Inc. (518) 48-404 Corporate Consulting Inc. (519) 48-404 Corporate Consulting Inc. (510) 48-404 Corporate Consulting Inc. (510) 48-404 Corporate Con		(212) 819-5000	NY	Pg 7				
Ainsworth Technologies, Inc. (416) 751-4420 CN Pg 4	Banking							
Course Development Fig. Course Development	Ainsworth Technologies, Inc.	(416) 751-4420	CN	Pg 8				
Price Waterhouse (212) 819-5000 NY Pg 7		(216) 328-2115		Pg 4		(400) 000 1011	0,1	.90
Data Design Advanced Data Management (800) 962-4377 NJ Pg Advanced Data Management (800) 962-4377 NJ Pg Pg Pg Pg Pg Pg Pg P								
Axiom						(800) 882-6420	MD	Pg 6
Axiom		(314) 434-6655	MO	Pg 4	Data Design			
Price Waterhouse Care Price Price Waterhouse Care Price Pric	Business Reengineering				Advanced Data Management	(800) 962-4377	NJ	Pg 9
Database Consultants Price Waterhouse (212) 819-5000 NY Pg 7 Pg 6	Axiom	(415) 398-3484	CA	Pg 4				
Price Waterhouse (212) 819-5000 NY Pg 7	C				Price Waterhouse	(212) 819-5000	NY	Pg 7
Price Waterhouse	Origin Technology in Business, Inc.	(614) 431-2345	ОН	Pa 4	Database Consultants			
Data Warehousing					Steven A. Gardiner Consulting, Inc.	(612) 476-0256	MN	Pa 6
Axis Consulting International, Inc. (415) 434-2947 CA Pg 6 Corporate Consulting Group (713) 521-2999 TX Pg 5 Keefer Consulting, Inc. (215) 246-3407 PA Pg 5 Montare International (214) 458-9430 TX Pg 5 Origin Technology in Business, Inc. (416) 431-2345 OH Pg 4 Price Waterhouse (212) 819-5000 NV Pg 7 Martin Consulting Corp. (407) 951-0934 FL Pg 5 CICS Price Waterhouse (212) 819-5000 NV Pg 7 Client/Server Analysts International Corporation (AIC)(800) 800-5044 IL Pg 5 CASE, Inc. (312) 346-0444 IL Pg 5 Continuum Consulting, Ltd. (800) 999-4829 WA Pg 6 Continuum Consulting, Ltd. (800) 999-4829 WA Pg 6 CASP, Apg 6 CASP, Apg 6 CASP, Apg 6 CAMBRS HCL America, Inc. (408) 733-0480 CA Pg 6 Avis Consulting International, Inc. (415) 434-2947 CA Pg 6 Greenbrier & Russell, Inc. (708) 706-4000 IL Pg 5 Case Technologies (919) 380 5000 NC Pg 7 Combinating Corp. (407) 951-0934 FL Pg 5 Crigin Technology in Business, Inc. (908) 225-5577 NJ Pg 6 Crigin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Client/Server Client/Server Analysts International Corporation (AIC)(800) 800-5044 IL Pg 5 Theatricks, Inc. (404) 928-3298 GA Pg 6	Theatricks, Inc.	(404) 928-3298	GA	Pg 6		(012) 410 0200		. 9 0
Axis Consulting International, Inc. (415) 434-2947 CA Pg 5 Corporate Consulting Group (713) 521-2999 TX Pg 5 Montare International (214) 458-9430 TX Pg 5 Montare International (214) 458-9430 TX Pg 5 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Pg 7 CASE/ADW Martin Consulting Corp. (407) 951-0934 FL Pg 5 CICS Price Waterhouse (212) 819-5000 NY Pg 7 P	CASE					(000) 000 4000		
Corporate Consulting Group	Axis Consulting International, Inc.	(415) 434-2947	CA	Pa 6	9,	(800) 999-4829	VVA	Pg 6
Keefer Consulting, Inc.					DBMS			
Montare International					HCL America, Inc.	(408) 733-0480	CA	Pg 6
Price Waterhouse (212) 819-5000 NV Pg 7 Seer Technologies (919) 380 5000 NC Pg 7 Seer Technologies (919) 380 5000 NC Pg 7 Intelligent Information Systems (919) 870-9356 NC Pg 6 (919) 870-936 NC Pg 6 (910) 870-936 NC Pg 6 (910) 870-936 NC Pg 6 (910) 870-936 NC P								
Seer Technologies		(614) 431-2345	ОН					
CASE/ADW								
Martin Consulting Corp. (407) 951-0934 FL Pg 5 Pg 5 OMNItech Consulting Services, Inc. (908) 225-5577 NJ Pg 6 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Pg 6 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, In		(919) 380 5000	NC	Pg 7				
Martin Consulting Corp. (407) 951-0934 FL Pg 5 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Pg 5 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (212) 819-5000 NY Pg 7 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (614) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (212) 819-5000 NY Pg 7 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345 OH Pg 4 Origin Technology in Business, Inc. (814) 431-2345	CASE/ADW							-
CICS Price Waterhouse (212) 819-5000 NY Pg 7 Price Waterhouse (212) 819-5000 NY Pg 7 Client/Server Desktop Publishing Analysts International Corporation (AIC)(800) 800-5044 MN Pg 4 Price Waterhouse (212) 819-5000 NY Pg 4 ESCA, Inc. (312) 346-0444 IL Pg 5 Theatricks, Inc. (404) 928-3298 GA Pg 6	Martin Consulting Corp.	(407) 951-0934	FL	Pg 5				
Price Waterhouse (212) 819-5000 NY Pg 7 Patricia Seybold Group (617) 742-5200 MA Pg 4 Client/Server Analysts International Corporation (AIC)(800) 800-5044 MN Pg 4 Price Waterhouse (212) 819-5000 NY Pg 7 ESCA, Inc. (312) 346-0444 IL Pg 5 Theatricks, Inc. (404) 928-3298 GA Pg 6								
Client/Server Analysts International Corporation (AIC)(800) 800-5044 MN Pg 4 ESCA, Inc. (312) 346-0444 IL Pg 5 Theatricks, Inc. (404) 928-3298 GA Pg 6		(212) 819 5000	NV	Po 7				
Analysts International Corporation (AIC)(800) 800-5044 MN Pg 4 Price Waterhouse (212) 819-5000 NY Pg 7 ESCA, Inc. (312) 346-0444 IL Pg 5 Theatricks, Inc. (404) 928-3298 GA Pg 6		(212) 013-3000	141	191	Desktop Publishing			
ESCA, Inc. (312) 346-0444 IL Pg 5 Theatricks, Inc. (404) 928-3298 GA Pg 6		IC/(800) 800 5044	8484	Pc 4		(212) 819-5000	NV	Po 7
terminal to the second								
						, , 520 0200	-	. 9 0

Disaster Recovery				JAD			
Price Waterhouse	(212) 819-5000	NY	Pg 7	Thomas Holland & Associates, Inc.	(800) 508-4359	KS	Pg 4
Raymond Professional Mgmt., Inc.	(800) 682-3439	GA	Pg 7	JCL			
E-Mail					(040) 040 5000	5137	0-7
Complink Ltd.	(516) 829-1883	NY	Pg 7	Price Waterhouse Languages/Programming To	(212) 819-5000	NY	Pg 7
EDI				Greenbrier & Russell, Inc.		11	D- F
DNS Associates, Inc.	(800) 624-6354	MA	Pg 7	Price Waterhouse	(800) 453-03470 (212) 819-5000		Pg 5 Pg 7
Origin Technology in Business, Inc.	(614) 431-2345	ОН	Pg 4	LAN's	(212) 010 0000	141	. 9
Price Waterhouse	(212) 819-5000	NY	Pg 7		(040) 040 5000	NIV	D- 7
Education/Training				Price Waterhouse Lotus Notes	(212) 819-5000	INY	Pg 7
HTR. Inc.	(800) 882-6420	MD	Pg 6	Applied Systems Company	(410) 889-9213	MD	Pa 4
BoyTan & Associates	(508) 635-9819		Pg 7		(410) 003-3213	IVID	194
The Dublin Group	(415) 227-4777		Pg 7	Management Consulting			
Gabrielle & Associates	(214) 690-0370		Pg 4	Axiom	(415) 398-3484		Pg 4
Greenbrier & Russell, Inc.	(800) 453-0347		Pg 5	Deloitte & Touche Nahmias & Company	(203) 761-3361 (203) 249-7079	CT	Pg 9 Pg 4
Information Technologists, Inc.	(800) 296-4600		Pg 4	Price Waterhouse	(212) 819-5000		Pq 7
Origin Technology in Business, Inc. Price Waterhouse	(614) 431-2345 (212) 819-5000		Pg 4 Pg 7	Systems Design & Services, Inc.	(708) 894-1674		Pg 8
	(212) 619-5000	141	ry /	Vital Technologies, Inc.	(415) 348-4848	CA	Pg 5
Enterprise Management				Manufacturing/CIM			
Information Retrieval Co., Inc.	(303) 763-9500	CO	Pg 10	Ainsworth Technologies, Inc.	(416) 751-4420	CN	Pg 4
Experimental Designs				Origin Technology in Business, Inc.	(614) 431-2345		Pg 4
Szonyi Associates	(617) 862-8385	MA	Pa 4	Price Waterhouse	(212) 819-5000		Pg 7
Expert Systems	,			Systems Design & Services, Inc.	(708) 894-1674	IL	Pg 8
Integrated Software Specialists, Inc.	(708) 240-5070	IL	Pg 2	MCBA			
Price Waterhouse	(212) 819-5000	NY	Pg 7	Systems Design & Services, Inc.	(708) 894-1674	IL	Pg 8
FAX Integration	(= 12, = 10 = 000			Metrics			
	(000) 547 0000			Integrated Software Specialists, Inc.	(708) 240-5070	IL	Pg 2
Stadnick & Company, Inc.	(603) 547-2000	NH	Pg 8	Multimedia			
Government				Adam Charles Consulting	(313) 482-1600	MI	Pg 8
MMA Consulting Group, Inc.	(617) 426-8049	MA	Pg 8	Price Waterhouse	(212) 819-5000	NY	Pg 7
Price Waterhouse	(212) 819-5000	NY	Pg 7	Network Management			-
Groupware				Litton Computer Services	(800) 752-6527	CA	Pg 9
Applied Systems Company	(410) 889-9213	MD	Pg 4	Price Waterhouse	(212) 819-5000	NY	Pg 7
Patricia Seybold Group	(617) 742-5200	MA	Pg 4	Networking	10.07		. 9 .
GUI							
Analysts International Corporation (A	IC)(800) 800-5044	MN	Pg 4	HCL America, Inc.	(408) 733-0480		Pg 9
Integrated Software Specialists, Inc.	(708) 240-5070		Pg 2	Adia Information Technologies	(800) 626-8082		Pg 4
Origin Technology in Business, Inc.	(614) 431-2345	OH	Pg 4	Axis Consulting International, Inc. Computer Communication Company	(415) 434-2947 (800) 638-5625		Pg 6 Pg 9
Price Waterhouse	(212) 819-5000	NY	Pg 7	Networking Solutions	(212) 321-1999		Pg 4
Help Desk/Customer Service	ce			Origin Technology in Business, Inc.	(614) 431-2345		Pg 4
The Help Desk, Inc.	(602) 460-1926	AZ	Pg 10	Price Waterhouse	(212) 819-5000	NY	Pg 7
Hypertext				NOVELL			
Adam Charles Consulting	(313) 482-1600	М	Pg 8	Price Waterhouse	(212) 819-5000	NY	Pg 7
1BIM	(515) 402 1000	tvii	190	Object Oriented Programmi		141	191
	(644) 404 0045	011	0 4	HCL America, Inc.	(408) 733-0480	CA	Pg 9
Origin Technology in Business, Inc. Vanguard Integrity Professionals	(614) 431-2345 (714) 939-0377		Pg 4 Pg 8	Adia Information Technologies	(800) 626-8082		Pq 4
	(/14/330-03//	CA	190	Greenbrier & Russell, Inc.	(800) 453-0347	IL	Pg 5
Imaging				Thomas Holland & Associates, Inc.	(800) 508-4359		Pg 4
Integrated Software Specialists, Inc.	(708) 240-5070		Pg 2	Kenda Systems, Inc.	(800) 435-3632		Pg 5
Origin Technology in Business, Inc. Price Waterhouse	(614) 431-2345 (212) 819-5000			Origin Technology in Business, Inc.	(614) 431-2345		Pg 4
	(212) 019-5000	INT	Pg 7	Price Waterhouse Quincy Street Corp.	(212) 819-5000 (602) 957-6741		Pg 7
Information Engineering				Patricia Seybold Group	(617) 742-5200		Pg 4 Pg 4
Keefer Consulting, Inc.	(215) 246-3407	PA	Pg 4	Online Documentation	,011,742 0200	- CAIPA	. 9 4
Origin Technology in Business, Inc.	(614) 431-2345			Adam Charles Consulting	(313) 482-1600	MI	Pg 8
Price Waterhouse	(212) 819-5000	NY	Pg 7	- Constanting	,5 10, 102 1000		. 90

Open Systems				SQL			
Patricia Seybold Group	(617) 742-5200	MA	Pg 4	Origin Technology in Business, Inc.	(614) 431-2345	OH	Pq 4
ORACLE				Price Waterhouse	(212) 819-5000		Pg 7
Database Technologies, Inc.	(508) 443-2580	MA	Pg 9	Staffing/Employment			
Networking Solutions	(212) 321-1999	NY	Pg 4	TechniSource	(800) 940-1111	FL	Pg 4
Origin Technology in Business, Inc.	(614) 431-2345	OH	Pg 4	Staffing Management			
os				Alternative Resources Corp.	(708) 317-1000	10	Pa 9
					(708) 317-1000	IL.	rg 9
Price Waterhouse OS2	(212) 819-5000	NY	Pg 7	Strategic Planning			
				Deloitte & Touche	(203) 761-3361		Pg 9
Origin Technology in Business, Inc.	(614) 431-2345		Pg 4	Greenbrier & Russell, Inc.	(800) 453-0347	IL	Pg 5
Price Waterhouse	(212) 819-5000		Pg 7	Origin Technology in Business, Inc.	(614) 431-2345		Pg 4
Softworld Corporation Theatricks, Inc.	(407) 995-8436 (404) 928-3298	GA	Pg 4 Pg 4	Price Waterhouse	(212) 819-5000	NA	Pg 7
	(404) 320-3230	GA	ry +	Systems Integration			
Outsourcing				HCL America, Inc.	(408) 733-0480	CA	Pg 9
HCL America, Inc.	(408) 733-0480		Pg 6	JPN Associates	(915) 584-3020		Pg 8
Advanced Data Management	(800) 962-4377	NJ	Pg 9	Ainsworth Technologies, Inc.	(416) 751-4420		Pg 4
Alicomp	(212) 886-3601	NY	Pg 8	Basis, Inc.	(510) 547-5900	CA	Pg 9
Litton Computer Services	(800) 752-6527		Pg 9	Deloitte & Touche	(203) 761-3361	CT	Pg 9
Origin Technology in Business, Inc. Price Waterhouse	(614) 431-2345 (212) 819-5000		Pg 4 Pg 7	Information Retrieval Co., Inc.	(303) 763-9500	CO	Pg 10
		14.1	rg /	Information Technologists, Inc.	(800) 296-4600		Pg 5
Performance Analysis & Tui	-			Integrated Software Specialists, Inc.	(708) 240-5070		Pg 2
HCL America, Inc.	(408) 733-0480		Pg 6	Litton Computer Services	(800) 752-6527		Pg 9
Price Waterhouse	(212) 819-5000	NY	Pg 7	Origin Technology in Business, Inc.	(614) 431-2345		Pg 4
PowerBuilder Training/Con	sulting/Deve	lopi	ment	Price Waterhouse	(212) 819-5000	MA	Pg 7
Powercerv	(813) 281-2990	FL	Pg 4	Technical Writing			
Project Management				Analysts International Corporation (All	C)(800) 800-5044	MN	Pg 4
Analysts International Corporation (Al	C)(800) 800-5044	MN	Pg 4	Telecommunications/Netwo	orking		
Adia Information Technologies	(800) 626-8082			Peek & Associates, Inc.	(503) 642-2727	OR	Pg 10
Greenbrier & Russell, Inc.	(800) 453-0347		Pg 5	Transaction Process Facility			
Thomas Holland & Associates, Inc.	(800) 508-4359		Pg 4			-	
Origin Technology in Business, Inc.	(614) 431-2345	ОН	Pg 4	Martin Consulting Corp.	(407) 951-0934	FL	Pg 4
Price Waterhouse	(212) 819-5000	NY	Pg 7	TSO			
Reengineering				Information Retrieval Co.	(303) 763-9500	CO	Pg 10
HCL America, Inc.	(408) 733-0480	CA	Pg 6	Price Waterhouse	(212) 819-5000	NY	Pg 7
Advanced Data Management	(800) 962-4377		Pg 9	UNIX			
Deloitte & Touche	(203) 761-3361		Pg 9	HCL America, Inc.	(408) 733-0480	CA	Pg 9
The Dublin Group	(415) 227-4777	CA	Pg 7	Axis Consulting International, Inc.	(415) 434-2947		Pg 6
Integrated Software Specialists, Inc.	(708) 240-5070	IL	Pg 2	Barbary Coast Consulting	(415) 923-1676		Pg 10
Price Waterhouse	(212) 819-5000	NY	Pg 7	Origin Technology in Business, Inc.	(614) 431-2345		Pg 4
Reverse Engineering				Price Waterhouse	(212) 819-5000	NY	Pg 7
Integrated Software Specialists, Inc.	(708) 240-5070	1L	Pg 2	VAX/VMS			
Rightsizing				Automation & Consulting Technology	(800) 877-6552	MA	Pg 10
	1400) 700 0400	0.4	D- 0	Advanced Data Management	(800) 962-4377		Pg 9
HCL America, Inc. Greenbrier & Russell, Inc.	(408) 733-0480 (800) 453-0347		Pg 6 Pg 5	Price Waterhouse	(212) 819-5000		Pg 7
Integrated Software Specialists, Inc.	(708) 240-5070		Pg 2	Visual Basic			-
Origin Technology in Business, Inc.	(614) 431-2345						
Price Waterhouse	(212) 819-5000			Applied Systems Company	(410) 889-9213	MD	Pg 4
Security	(= 1=, 0 10 0000			Windows			
Security				ESCA, Inc.	(312) 346-0444	IL	Pg 5
Advanced Data Management	(800) 962-4377			Adam Charles Consulting	(313) 482-1600	IM (Pg 8
Deloitte & Touche	(203) 761-3361			Price Waterhouse	(212) 819-5000	NY	Pg 7
Price Waterhouse	(212) 819-5000	NY	Pg 7	Windows APIs			
Security Software				Applied Systems Company	(410) 889-9213	ME	Pg 4
Price Waterhouse	(212) 819-5000	NY	Pg 7			.410	. 9 7
Vanguard Integrity Professionals	(714) 939-0377			Windows Application Deve			
Software Testing				The Help Desk, Inc.	(602) 460-1926		
HCL America, Inc.	(408) 733-0480	CA	Pa 9	Theatricks, Inc.	(404) 928-3298	GA	Pg 4
Price Waterhouse	(212) 819-5000		0				
	12 .2, 0 .0 0000		. 8				

ontracts

The following companies are members in good standing of the NACCS (National Association of Emmyler Consulting Businesses). The NACCB represents the nations most reputable contract somuting businesses and ensures that those companies that specialize in providing highly skilled contract professionals adhere its high ethical and professionals adhere its high ethical and professional standards. If you need lempurary services of a computer or engineering professional, contact a member of the NACCS.

WEST

BEST

BEST CONSULTING - Making a Difference The premier NW consulting/contracting organization, with over 150 people who take price in their profession and truly want to make a professional difference. Experienced project leaders, software engineers, system architects & administrators, analysts & PIA's enceded to develop Client Server, as well as traditional mainframe & mini based software. Services provided through our Client Server System Integration Division and our Consulting/Commercing Division. Competitive salaries plus flexible benefits & profit sharing offered as well as hourly positions. Send resume or call: SIMPLY THE BEST-1940 116th Ave. NE, Belleuwa, WA 98004; (200) 637-0130, (200) 637-9550 FAX.

MIDEON

(714) 579-3000 (415) 617-3700 FAX (800) 444-5443 Modem: (714) 996-7777 4175 E. La Palma Ave., Suite 200, Anaheim, CA 92607

Deltam

EXETEMS, INCOMPONATED

Others Mationwide Consulting Opportunities

1400 Fashion Island Blvd., 4303 San Mateo, CA 94404 Tel (415) 571-0551 Fax (415) 571-1459

Computec International Resources Inc.

We specialize in rare skills, nationwide and worldwide: Synon, IEF, ACP/TPF, Hogan, Systematics, ADABAS/

NATURAL Full benefits

230 North Maryland Avenue Suite 209, Glendale, CA 91207 (818) 500-3921 · FAX (818) 500-3924 BBS (818) 500-4021 San Francisco · London · Sydney

GENTRY INC.

DB2, CICS, IMS, ADABAS/NATURAL; UNIX, C, C++; LANS; ORACLE, SYBASE, INFMX, etc.; IBM, SUN, HP3000, AS400, PC'S; CLIENT-SRVR

510-547-6134 • FAX 510-547-0119

Suite 1400 San Francisco, CA 415/777-4321 CONSULTING 415/777-8632 FAX

DATA DESIGN CORPORATION

COMPUTER CONSULTING Voice (714) 891-2811 FAX (714) 895-9569

TECHNOLOGY LOCATOR

"The Right People for The Job" So Calif Contracts Information Systems Software Engineering Voice: 800/275-4852 Fax: 619/552-6820

CHAMBERLAIN **Associates**

1875 S. Grant St., Ste. 1050 San Mateo, CA 94402 (415) 358-3737 FAX (415) 574-2090 The N. Calif. Consulting Resource

SOUTHERN CALIFORNIA

Contract, Perm, S/W Development, MF & PC, Client/Server, CASE 310-416-9846 Fax 310-416-9003



MIDWEST

Interactive Business Systems, Inc.

2625 Butterfield Rd., Suite 114W Ook Brook, II. 60521 708-571-9100 Mainframe, Midrange & PC Consulting Contact: Bruce Stopka, VP Bob Kloss, Manager of Recruitment



DHS & Associates, Inc. Leaders in CASE, Client Server, GUI.

1400 E. Touhy Ave., #300 Des Plaines, IL 60018 708.297.5600 or Fax 708.297.5607

Permanent Contract Avail. 111

Associates, Inc. P.O. Box 1724 · St. Louis, MO 63043 314/434-1976 · FAX 314/434-0952

UTEK, Inc.

3030 Warrenville Road Lisle, IL 60532 708-505-1888 Mission-Critical Solutions for CLIENT/SERVER and UNIX



Opportunities
Available National
SAS, ORACLE,
INFORMIX,
PARADOX, GUI

Trilogy Consulting Corporation 859 S. Greenbay Road Waukegan, IL 60085 (708) 244-9520 · FAX (708) 244-9335

SOUTHEAST

Consulting Group
Contract Professional Services

1-800-222-1273 FAX (803) 738-9123 (VA, NC, SC, GA)

Information Services 800-676-TFAM

fax 407-324-8566 PO 952333, Lk Mary, FL 32795



TECHNOLOGY CONSULTING INC.

MAINFRAME MIDRANGE, PC - CLIENT SERVER SYBASE - Regional Teaming Partner (800) 829-4824

FAX (502) 589-3107

CANADA

No. VIII. CANADA

ASSOCIATES

Toronto Onturio MSJ 1H8 Telephone: (416) 593-1660 Facsimile: (416) 593-1661

NORTHEAST

8 Strathmore Road Natick, MA 01760 1-800-327-0434



CONTRACTS IN: PA, NJ, & DE

DEVON CONSULTING

435 DEVON PARK DRIVE SUITE 410 WAYNE, PA 19087-1941 215-964-2700 FAX: 215-964-2708



Contract Services Software/Hardware Engineering Information Systems

· Client Server · OOD/OOP · RDBMS · Multi-Media · Communications · GUI

Lakeside Office Park
591 North Avenue, 5B, Wakefield, MA 01880
617.246-1600 Fax 617.245-6537
Internet: eliassen @ world.std.com.

Tel Tech 39 Broadway New York, NY 10006

Cuposition
7 NJ GR FIAS Wats D C
7 NJ GR FIAS WATS D
7 N

15 Richardson Ave.
P.O. Box 308
Waterfield, MA 018B0
800234-8075 [outside NF only]
FAX: (617) 246-44734
Contract Software Development
Specialists Since 1883
Bocton • Milami

German firm heads to client/server era

KIEL GERMANY



For Krupp Mak Maschinenhau GmbH. outsourcing marks the beginning of the client/ server era.

The company's in-house profit cen-

ter, Mak Data Systems (MDS), ran Krupp Mak's information systems operations until recently, when it placed that responsibility in the hands of a Dortmundbased data center that belongs to the Hoesch-Krupp group. At the same time, Krupp Mak began work on a decentralized architecture across all divisions of the mechanical engineering company.

MDS is determined to abandon in mid-1994 its 55 MIPS Hitachi, Inc. mainframebased data center, which has supported IS services for 30 years.

We know by now that the most economical solution is to get rid of the mainframe," said Hans-Ulrich Nelte, director of Krupp Mak's IS unit and chief at MDS. He estimated that the transition to a decentralized platform will take two to three years. "When we began thinking about a more economical IS solution three years ago, we were not aware that eventually we would go client/server . . . Initially, we were considering the outsourcing route."

After two years of negotiations with

tronic Data Systems Corp., Debis and NIS Kiel (an IS subsidiary of Preussag and HDW), Hoesch-Krupp decided to consolidate the IS activities of all its companies at the one Dortmund site.

Move to client/server

Hoesch-Krupp also decided in mid-1992 to set up a client/server architecture to be implemented in value-added Krupp Mak divisions. These include operations such as manufacturing, maintenance of production facilities, materials management and control, quality management, product development, marketing and sales, customer service and administra-

Krupp Mak considered a contract with an outsourcing company, but under a new Hoesch-Krupp policy the firm could tap an outsourcer to handle computer operations only for a limited, three- to four-year transitional period.

"Had we decided to keep our own IS operations running until all new solutions are implemented, we would have been faced with the mounting costs of the new environment, in addition to regular expenses incurred by operating our own data center. If you decide, however, to pass the entire data center into the hands of an outsourcer, you can cut these operating costs step-by-step, as the new system is being implemented," Nelte explained.

Of course, the outsourcer must accept

supposed to provide diminishes as the project proceeds. As more parts of the decentralized solution are finished, a firm should be in a position to cancel the corresponding "central" services provided by the outsourcer.

Such an approach, however, is not really to the liking of major outsourcing companies such as EDS or Debis. Their favored contract periods usually range from five to 10 years. Only NIS Kiel offered a contractual model that was comparable to the one drawn up by the Dortmund-based data center. Nelte noted.

Transition phase

In mid-1994, operations will be handed to the new site in Dortmund. Both Krupp Mak and MDS' external customers will then get their IS services on-line. Concurrently, the company will start building the new architecture, introducing new solutions piece by piece. At the end of the transitional phase, Nelte said he expects to have four IBM RS/6000 machines - in as yet unspecified configurations - acting as servers under IBM's AIX operating system. Various types of PCs will act as clients, taking the place of the current 500 PCs and 3270-type terminals.

MDS is banking on various software vendors. It chose SAP AG's R/3 package for commercial tasks and human resources. "Yet administrative functions are not really our key concern," Nelte said. "In fact, in implementing R/3, we

tually long been resolved."

For value-added processes, Krupp Mak will use Software AG's Prodis Unixbased production control application, which the company considers to be a 'perfect alternative product to R/3.'

"Prodis is a core solution which allows us to adapt the software to our specific needs very easily," Nelte said. In areas such as product development, marketing and customer support, Krupp Mak will continue to use its own homegrown solutions. Software AG's Adabas will remain the central database.

The firm's affinity to SAP as well as to IBM — because MDS acts as distribution partner in the RS/6000 business - is partly because of long-standing business relations. Meanwhile, a number of MDS' clients are external customers, and the firm generates 45% to 50% of its sales revenue by offering solutions for Adabas and Software AG Natural environments.

The road ahead

It will take two or three years before all IS services are running on a client/server basis, Nelte predicted. The company expects to save some \$1.08 million, or 30%, per year over today's IS operating costs. Nelte would not detail the project's cost.

"So far, we have calculated the costs for only two of the areas, and since the server configuration is still unclear, we are not able to be specific on the overall costs of the project as yet," Nelte said.

NCR software unit's efforts

CONTINUED FROM PAGE 79

"I think it's important to win over the hearts, souls and business of NCR's brethren, but I do not feel bound in any way to that environment." Clark said.

Clark also said he views the software division as an additional op-

Software

services

make up

more than

40% of

NCR's

annual

revenue, or nearly \$3

billion.

portunity for NCR to implement AT&T's vision of converging computing and communications.

Since AT&T acquired NCR in 1991, the two worked have closely with AT&T's Bell Laboratories

research unit to develop technologies that can facilitate remote communications

"I believe we'll be an important component of 'Anytime, Anywhere.' We think that's where the world is going," Clark said.

Software Engineering of America has announced Total Report Management Solution (TRMS) Release 4.3, an end-user/report management component of the firm's automated output management system Savrs/Trms, for MVS environments.

According to the Franklin Square, N.Y., company, the product features an on-line index and table of contents that enables users to quickly locate specific information in a report by selecting from a customized on-

Scrolling or searching through the report by character or page is not necessary.

When there is a change in the value of designated fields on the report-image page, a Break On feature automatically creates distribution.

TRMS now supports records of up to 32K bytes in size

Prices for TRMS range from \$27,500 to \$55,165.

► Software Engineering of America (516) 328-7000

American Software has announced the AS/400 Client Series, workstation-based products using the IBM AS/400 as a server.

The series consists of a family of client applications and decision-support productivity tools for increased functionality and network capabilities for distributed processing among servers.

The tools were also designed for Microsoft Corp.'s Windows environment and Windows NT operating system.

According to the Atlanta-based company, the series encompasses a range of workstation-based application capabilities interacting with enterprise databases residing on one or more AS/400 enterprise

Workstation-based functions such as customer service, accounting, purchasing, distribution/logistics and manufacturing are areas of focus for the product.

Pricing for the series is \$100 to \$600 per component.

► American Software (404) 261-4381

Grafpoint, Inc. has announced GT-320 for Windows, GT-340 for Windows and GT-X 340, three Digital Equipment Corp.-style terminal emulators.

GT-320 for Windows is high-performance VT320 terminal emulation software for alphanumeric application users. GT-340 for Windows emulates VT340 terminals and can be used for Regis-style graphic applications.

According to the San Jose, Calif.-based company, GT-X 340 is an X Window System client application supporting Regis, Digital and VT320 alphanumeric terminal emulation on an X display.

Pricing begins at \$195.

Grafnoint (408) 446-1919 SAP America, Inc. has announced the availability of Oracle Corp.'s Oracle 7 database for SAP's R/3 client/server business applications software.

According to the Philadelphia-based company, R/3 applications use Oracle's technology specifically to ensure stability and reliability in the management of large data sets and in the processing of large transaction volumes within a client/server environment.

Users may benefit from Oracle 7 features that include stored procedures, a parallel server option, triggers and transparent distribution with two-phase commit

Pricing ranges from \$19,000 to \$76,000, depending on the number of users.

► SAP America (215) 521-4500

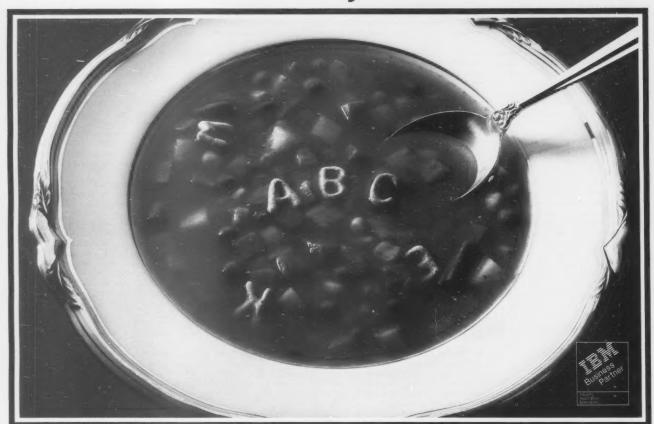
Novadyne Computer Systems, Inc. has announced Reality-Check, an on-line software utility designed for the McDonnell Douglas Corp.-based Reality line of minicomputer and super minicomputer sys-

According to the company, which is based in Santa Ana, Calif., the software is a multifunction system management tool that continually monitors system resources, providing critical data for system management and automatically enhancing system integrity.

Pricing for the utility is \$1,595.

► Novadame (714) 566-2000

Creating Reports With FOCUS Is As Easy As...



FOCUS For AS/400 From Information Builders. Its Plain English Syntax Makes Complex Report Writing This Simple.

There's no question that the most common task in data processing is report writing. Or that the people who need reports most are the ones who have the most difficulty getting them.

Well now you don't need complicated traditional programming languages because with FOCUS for AS/400 all your reporting requirements can be accomplished in plain, simple English.

A SINGLE LANGUAGE THAT WORKS FOR EVERYONE

With FOCUS all syntax and commands are in English, non-procedural and free form. That means the end of complex coding and confusing command structures. You don't have to be a rocket scientist to enjoy the benefits of FOCUS.

Yet even the most expert DP pros find that FOCUS's

comprehensive data analyses abilities, and complex request functionality allows them to build the advanced information systems their companies need in today's tough business environment.

THE BEST TOOL FOR THE BEST PLATFORM

There isn't a single solution you can buy that delivers a better report writing capability than FOCUS. Because unlike everything else, it isn't just a query tool. It's a fully functional, feature rich solution that works with every available application package for the AS/400, more than 9000 in all.

THE REPORTS ARE IN

IBM has selected Information Builders as an Industry Application Specialist and a member of the

IBM Customer Advisory Panel for Application Development on the AS/400 platform. And they've done it because feature for feature, they know there isn't a better 4GL you can buy.

Don't just take our word for it. An independent study showed that 100% of FOCUS for AS/400 users rated the product as excellent and would purchase it again.

So if the AS/400 is your platform of choice, shouldn't you be looking at the 4GL that's the first choice of AS/400 users?

For more information, or to attend a FREE FOCUS Seminar...

CALL 800-969-INFO

In Canada call 1-416-364-2760

Information Builders, Inc.

All names and products mentioned are the trademarks or regimered trademarks of their respective holders. FOCUS is a registered trademark of Information Builders, Inc., 1250 Broadway, New York, NY 1000

LANGUAGES

Application Development

SPEECH RECOGNITION TOOLS ENHANCED, 100 JAM TOOLS UPGRADED, 110 **NEW PRODUCTS, 111**

Wang to open Pace tools

By Craig Stedman LOWELL, MASS

Wang Laboratories, Inc. plans next month to add Open Database Connectivity (ODBC) support to the query tool in its Pace for Open Systems application development product line. That will represent the first step toward decoupling the Pace tools from the database with which Wang currently integrates them.

The company hopes the decoupling strategy will let it move Pace for Open Systems into the generalpurpose development tools market.

Wang's linkage of the tools to its own database blocks that process and has been criticized by some users who are migrating from Wang's VS computers to Unix systems and changing databases [CW, July 121.

Support would help

The lack of support for outside databases "is very, very limiting, to say the least," noted Ajit Kapoor, a principal at Intelligent Solutions in Marshfield, Mass.

Neil Exter, director of open software marketing at Wang, said the company has sold more than 6,000 Pace licenses, although most were for the VS versions of the software. He declined to break out the number of licenses for Pace for Open Systems, which just started shipping this year.

The ODBC-compliant version of Wang's Query Builder tool should be able to query any database written to the ODBC specification for decision support purposes, Exter

Setting the Pace

Wang's Pace for Open Systems application development software includes four tools for use on Windows-based PC's, plus the company's own database

DICTIONARY BUILDER:

Defines data properties and business procedure rules and stores them in a centralized dictionary. pports triggers, referential integrity and event

APPLICATION BUILDER:

Creates Windows front-end applications through a GUI. Allows integration of image and video files and access to spreadsheets and word processing

QUERY BUILDER:

Icon-based, ad hoc querying tool for retrieving data from a database.

REPORT BUILDER:

enerates reports, mailing labels, forms and form letters using retrieved data. Based on Concentric

PAGE SERVER:

SQL-based relational database with built-in client-level administrative tools. Runs on IBM and

e: Wang Laboratories, Inc., Lowell, Mass.

said. The new software will have "significantly different code" than the existing Query Builder and will be marketed under another name, although the Windows graphical user interface will be similar, he

Wang expects to follow up the Query Builder move in 1994 by separating the Application Builder portion of Pace from its database, Exter indicated. The company is trying to interest major relational database vendors in joint develop-

However, noted that Wang is "evaluating what the appropriate technical approach is" for hooking the development module and a companion dictionary tool to exterdatabases. "When you're just doing query, it's a simple thing," he said. When you start doing [application development], it becomes more difficult.'

Exter would not say which outside database would be supported first, but industry observers pointed to The ASK Group, Inc.'s Ingres software as a leading candidate, given a recent deal under which Ingres will resell Wang's imaging software. Marilyn

Bohl, director of worldwide engineering at Ingres, declined to comment on the matter.

Fleishman-Hillard, Inc., a St. Louis public relations firm, just started shifting from VS machines equipped with Pace to a Unix client/server setup using Informix Software, Inc.'s database and Powersoft Corp.'s development tools. But Stephen Jung, vice president of corporate computer services, said he would give Pace another

Wang, page 110

Applix lays framework for app integration

By Melinda-Carol Ballou WESTBORO, MASS

Applix, Inc. last week introduced ApplixWare, a series of products for integrating applications and business data for end users, information systems managers and application developers

While some of the ApplixWare products, including a database access package and a programming tool, are new, Applix has primarily repackaged its office automation and other software to be more of an integrated family rather than



The ApplixWare product line includes Applix Graphics, a drawing package that integrates graphics with data

discrete products. This new family, Applix said, can be more easily combined with other third-party software.

"Applix is repositioning its products with new features toward more of what they really are . . . making Unix look like one integrated desktop," said Rikki Kirzner, an analyst at Dataquest, Inc., a consulting firm in San Jose, Calif. "It pulls all the office applications together to make Unix thoroughly usable.

Based on Applix's Asterx, ApplixWare makes it easier to access, share and present information across Unix, PC desktops and the enterprise, the company said.

Access to databases is provided via ApplixData, a new product. By the end of this year, Applix will offer Applix-Builder, a programming tool for developing applications un-

ApplixWare, page 109

IBM expert system app answers tech questions

Hoping to speed up the development of OS/2 applications, IBM's Personal Software Products (PSP) has rolled out an expert systems-based application that helps corporate and third-party developers solve their technical problems

Integrating intelligent retrieval technology, AskPSP lets developers describe a problem in plain English. The system then either responds with a series of possible solutions, based on a library of case studies, or asks additional questions to hone down its search for answers.

AskPSP integrates a beta version of Inference Corp.'s CasePoint Version 1.3 for OS/2. CasePoint supplies high-speed, read-only access to case study libraries developed with Inference's CBR Express, a tool for creating case-based retrieval systems.

CBR Express incorporates Inference's ART-IM development tool, which lets developers create intelligent client/server applications, an Inference spokesman

Once AskPSP receives a question, it "immediately produces a ranked list of likely cases where you might find your

answer," said Avron Barr, director of marketing at Inference.

At the same time, the program generates a list of questions to help users better understand a developer's particular situation and determine whether it has seen this set of circumstances before. The program uses deductive reasoning, asking questions that developers then use to zero in on the possible culprit.

Each answered question is scored or rated so developers know whether they are getting closer to or further away from a definitive answer.

Real questions from real users The individual cases that make up the library were written by people who answer the company's technical support hot line, not documentation writers

The data contained in the cases is the

most current information available and is organized around the way developers phrase their problems over the phone.

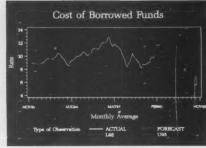
If developers cannot find a solution to a problem, they can generate an "unresolved case," which they can send to IBM technicians. The resulting body of unresolved cases then becomes a shared resource among developers, who can loosely collaborate with IBM technicians on possible solutions.

IBM has distributed AskPSP at no charge to more than 2,000 developers. The company said it will have a limited number of free copies of the program available to developers working on OS/2 and IBM LAN Systems products.

Corporate and third-party developers who want a copy of the program should call Personal Software Products Developer Assistance at (407) 982-6408



Financial Planning



Econometric and Time Series Analysis



Executive Information Systems

The SAS System.
The World's Leading
Information Delivery

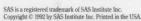
Quality Improvement

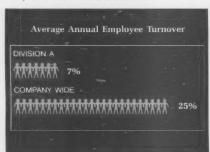


Computer Performance Evaluation

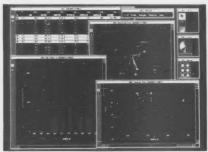


SAS Institute Inc.
Software Sales Division
SAS Campus Drive □ Cary, NC 27513
Phone 919-677-8200 □ Fax 919-677-8123





Reporting



Visualization



Market Research



Data Analysis



Business Graphs



Project Management

Tools bolster speech recognition applications

By Melinda-Carol Ballou BOULDER, COLO.

Speech Systems, Inc. has released a new version of one of its software packages to help developers build speech recognition applications using some common development tools

The company is now shipping Version 2.0 of Spot, which offers performance improvements and a range of new features.

Speech Systems' Spot VBX software can be used with Microsoft Corp.'s Visual Basic, and Spot can be used with Visual C++ and Borland International, Inc.'s C++ tools

Spot and Spot VBX are part of a series of tools that Speech Systems supplies with its software developer's kit for Phonetic Engine 400 (PE 400). PE 400 is a PC-based recognition speech system that is speaker-independent and allows for continuous speech recognition.

Different voices Speaker indepen-

Syntax

ture for the syntax of the utter-

The phonetic decoding software parses the data and matches it

These are then transmitted to the application software.

The Loral Command and Control Systems Division of Loral Aerospace Corp. evaluated the PE 400 system for an application that would run inside a tank.

George Price, senior software engineer at Loral, said the ability of PE 400 to handle continuous speech cut the time to run one application in half.

'We evaluated another card that used voice matching for discrete inputs, and it took us three minutes. With [PE 400], it took us about a minute and a half to enter

Speaking up

Speech Systems promises to make it easier to build Windows-based speech recognition systems

decoding

change commands without having to change code," said Rick Turek, software engineer at Lockheed Missiles and Space Co., a Lockheed subsidiary.

Spot VBX is a custom control tool for Visual Basic that shows up as a tool under Visual Basic and can then be dragged from the Visual Basic tool palette onto the form of the developer's applica-

DLL interface

Developers writing applications in C or C++ can use Spot lib, a set of functions for creating speech rec-

ognition contexts and properties. The interface to Spot is through Dynamic Link Libraries; it can be used not only with tools such as Visual C++ but also with macros.

The new version of these tools offers pipelining, so Spot begins to decode utterances as soon as they are spoken rather than after the speaker finishes.

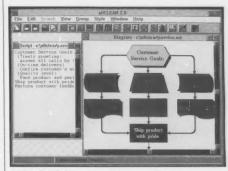
which increases performance. The new version can also display alternative "decodes," or results to the end user, as well as partially decoded utterances.

The PE 400 developer's kit, which includes Spot and Spot VBX, costs \$499 until the end of December, when the price will rise to \$999. The PE 400 Speech Recognition System, which includes an analog interface, a converter, two processors and a PC bus interface. sells for \$3,400.

AllClear for charts

Clear Software, Inc. has come up with a Windows-based package that lets users convert written descriptions of business procedures into flowcharts without drawing a single

AllClear for Windows works with a wide range of bestselling Windows spreadsheets, word processors and databases such as Lotus Development Corp.'s 1-2-3 for Windows and Microsoft Corp.'s Word for Windows.



AllClear for Windows shows diagram and text on one screen

Files from these applications can be transformed into diagrams and exported into Windows applications

The package allows multiple diagrams to be opened at once. With a split screen, users can edit text on one side of the screen and see the changes in the flowchart on the other side, said Vadim Yasinovsky, president of the Newton, Mass.,

The Internal Audit Department in the national office of the American Automobile Association (AAA) is using the program to document a range of processes in the organization for example, to help employees better understand how an insurance claim is processed.

The program helps us to identify what 'is' so we can compare that to what 'should be,' "said Donald Caniglia, AAA's manager of information security. Caniglia said he has also used AllClear for Windows to document information flows so he can carry out risk assessment of customers.

The program works by translating punctuation marks into specific chart functions. For instance, a period at the end of a line represents a single step, a question mark means a dual choice and a colon means a multiple choice. By following these cues, users can describe a particular process and then convert it to a standard flowchart in a few seconds.

Slated to ship by Oct. 1. AllClear for Windows is list priced at \$295 for the standard version; other versions cost more.

dence means PE 400 can recognize words from a variety of people instead of only one person. And rather than requiring discrete, separate utterances, PE 400 uses algorithms that translate speech into phonetic codes (see chart). which are then decoded by a language model that offers a struc-

with its dictionary to establish the

a message and get it transmitted, which is almost as fast as typing it," he said.

Dictionary

For its part, Lockheed Corp. is using Spot with Visual C++ and Borland's C++ tools to develop a speech application for data entry into a relational database management system and a global information system.

It opted for Speech Systems due to its speaker independence and flexibility. "They use grammar to represent command syntax,

> allows power users and programmers to customize their ApplixWare applications or to build and deploy their own.

> Roy Shilling, a senior research engineer at Arco Exploration and Production Technology, the research and development division of Arco Corp. in Dallas, used ELF to develop custom drilling applications, for example. Dubbed the "drilling calculator," Shilling's group created 55 dialog boxes with complex drilling calculations.

Easier PC integration

Shilling said features available with the new Applix products make it easier to transfer files back and forth between the Unix-based Applix applications and current versions of Microsoft Corp.'s Word and Excel on Windows.

"This gives us better integration with PC users and makes it easy to transfer documents," he said.

The city of Fort Collins, Colo, is using Applix's Asterx for its on-line network operations manual. Users access the applications from either a Unix network or a Novell, Inc. LAN of PCs, according to Bill Roberts, automation and maintenance

The following applications are included with the ApplixWare product line: Applix Words, Applix Graphics drawing package, Applix Spreadsheet and ELF. Also included are Applix Mail with support for spell checking, automatic sorting, conversion of incoming messages and shared folders; and Open Mail with X.400 support and filters to and from popular text formats. Options are also available for import/export to WordPerfect Corp.'s WordPerfect, Microsoft's Word, Interleaf, Inc.'s Interleaf and Frame Technology Corp.'s FrameMaker. Applix Data offers links to relational databases from Oracle Corp., Sybase, Inc. and The ASK Group, Inc.

Each member of the ApplixWare product line can be integrated with outside data sources, including MAPIs, multimedia information such as video, audio and images and real-time data feeds from external networks.

Applix Words and Applix Graphics, including ELF, are sold together for \$695; Applix Spreadsheet is priced at \$495. Applix Data costs \$995, Applix Mail \$195 and Applix Open Mail \$295. Pricing for the optional filter packs is \$295 each. These products are shipping now.

Applix framework

CONTINUED FROM PAGE 107

der the ApplixWare umbrella with Extension Language Facility (ELF), Applix's interpretive programming language. ApplixWare is based on an object-ori-

ented architecture the company has dubbed "information objects." These are any data source relating to the desktop or the enterprise, such as ApplixWare applications, development tools, multimedia information, messaging application programming interfaces (MAPI) and external personal and business applications. This architecture provides user access to data from the desktop.

Underlying ApplixWare is ELF, which

Jyacc hopes users will JAM with easier tools

By Melinda-Carol Ballou NEWYORK

Jyacc, Inc. last week introduced a new version of the company's JAM development tools that brings visual capabilities and ease of use together with object orientation and the ability to manage heavy-duty, transaction-intensive applications, company officials said.

JAM Version 6 is a major rewrite of JAM. Central to the new release is a Visual Object Repository, which stores pictorial representations of application objects, according to Jyacc.

It also stores data elements and their properties and can contain information about how database tables are related, as well as entities such as push buttons and their behavior, procedures and bitmap images, the company said

With the object repository, developers are able to intuitively build distributed applications - without having to write code — by dragging and dropping visual objects from the repository.

These objects then retain an inheritance link or relationship to their ancestors in the repository. Version 6 supports multiple levels of inheritance, data abstraction and encapsulation.

The new version also offers a Transaction Manager to handle the interaction between an application and one or more back-end databases. JAM defines a default transaction model that defines the optimal processing behavior for that database management system.

JAM also lets developers modify those models to globally affect application behavior. In this way, developers can attach user hooks to override the model or code their own database access

JAM Version 6 offers an icon and menubar graphical editor, a debugger, a SQLbased, flat-file manager and the Visual Object Repository. It also offers support for development in character mode

JAM Version 6 is slated to be available by year's end starting at \$2,000.

Wang sets Pace

CONTINUED FROM PAGE 107

Resellers

required

Wang is trying to sign

up resellers to handle

marketing of the

ODBC-compliant

release of its query

tool. The company will

do some direct sales

of the product, "but

the real thrust will be

in alternate

channels," said Neil

Exter, director of open

software marketing at

Wang. The software

will use a

Windows-based GUI

and support the

merging of queried

data into word

processing

documents, he noted.

look if Informix support were added.

"Pace is pretty friendly," said Jung, who continues to use the VS version of the Wang software. "The question would be, how does it stack up against [other tools), both in development capabilities and resource usage?

However, the new strategy comes too

late in the game for Ramsay Millar director of MIS at the British Columbia Tourism and Culture Department in Victoria. British Columbia, and chairformer man of the Americas Pace **Special Interest** Group. "That's a great idea, but unfortunately it's too little, too late," said Millar, who unplugged most of his VS systems

this year. Analysts had mixed outlooks on Wang's ability to sell Pace beyond its in-

stalled base. "They've got a really nice tool," said Bruce Silver, a vice president at BIS Strategic Decisions, a Norwell, Mass., consultancy. "If people give it a fair look, it will be interesting."

Rich Finkelstein, president of Performance Computing, Inc., a consulting firm in Chicago, was more skeptical. "The market is already saturated, and this kind of metamorphosis usually doesn't work well," he said. "It's hard to unhook" tools that were designed for a specific database, he said.



AT 9 A.M. HE DIDN'T KNOW HOW

world is no good if you can't use it. Approach

When Don Glor came to work on the morning of September 15th he'd never used a database before. Two hours later he'd developed his first application - it looks like a fire truck:

actually it's a customized inventory and billing management system for the South County Fire Department, San Mateo County, CA.

Don was using Lotus® Approach™—the only database designed for fire fighters. And lawvers and doctors and business people. And anyone who isn't necessarily a computer expert.

is expressly designed to be easy. There's no programming to learn. No endless documen tation to study. And according to independent





Approach lets you get to work right away in familiar. easy to understand desktop items. You can generate reports, forms or form letters — you can even print mailing labels to match any specification.

INTRODUCING APPROACH 2.1. THE RELATIONAL DATABASE ANYONE CAN RELATE TO.

All the power and functionality in the

research. "The average Approach user produces real results with their database in 2 hours*

This will surprise anyone who has tried to work with databases like Paradox® or Access According to Don, I tried Access and shelved

light reading next to Paradox's 1300 pages of programming instruction. their products were not

> really is accessible, and you work in one of four familiar desktop items - reports forms mailing labels or form letters - that look and work just like you expect them to to help you be productive right out of the box.

ness users

it. It was just too difficult to get a handle on."

That's not surprising considering the 543

page supplemental language reference for

programmers Don would've had to pore

through. Which looks like

The difference is that

With Approach you

have database power that

designed for general busi-













Application Development

The Alsys CASE Division has announced TeleUse/DB 1.0, a graphical user interface (GUI) builder that enables developers to create the Open Software Foundation's Motif GUIs for database applications.

According to the San Diego company, TeleUse/DB 1.0 provides 100% Motif widget support, which allows simultaneous support of interfaces for multiple databases when used with the TeleUse User Interface Management System. The migration path permits advanced functionality, such as dialog management, graphics and custom widget support. TeleUse is available for Sun Microsystems, Inc.'s SPARCsystems running SunOS 4.1.2 and Sybase, Inc.'s Release 4.9.2.

A single-user license costs \$1,990. ► The Alsys CASE Division (619) 457-2700

Persistence Software, Inc. has announced Persistence 1.4, a development tool designed for building object-oriented applications that transparently access data in relational databases.

Support is provided on Hewlett-Packard Co.'s Precision Architecture-RISC workstations and Sun Microsystems, Inc.'s workstations.

According to the San Mateo, Calif., company, Persistence employs an object model as input and can automatically generate C++ classes for interfacing with relational databases similar to the code that is generated by tools for constructing graphical user interfaces.

A developer's license costs \$14,995, and software support is priced at \$2,995.

▶ Persistence Software (415) 341-7733

Sign-On Systems, Inc. has introduced Sign-On For Fox, a FoxPro Pen Interface library for Windows for Pen Computing.

The product includes more than 100 functions that interface directly within the Windows for Pen application programming interface, according to the Beverly Hills, Calif., company.

At the field level, programmers can change directories and recognizers and turn handwriting recognition on and off.

Sign-On For Fox costs \$495. ► Siam-On Systems (310) 274-7477

Michaels, Ross & Cole Ltd. (MRC) has introduced its external objects feature in Release 4.0 of the MRC-Productivity Se-

According to the Lombard, Ill., company, the product empowers end users and programmers to define virtually any non-MRC program or routine as an external "object," grab the object and seamlessly execute it from within an MRC application or report.

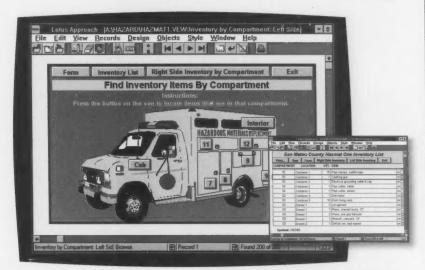
Users can access multiple layers of information from disparate databases by building their own drill-down applications with the product.

Prices range from \$4,000 to \$69,500.

► Michaels, Ross & Cole (708) 916-0662

Product shorts

StratosWare Corp. has introduced MemCheck 3.0 Professional for DOS, an error detection and prevention tool for C and C++ programmers. MemCheck 3.0 Professional detects memory overwrites and underwrites, stack overwrites, memory leaks, out-of-memory conditions and heap corruption. Cost: \$139. StratosWare, Ann Arbor, Mich. (313) 996-2944.... Kedwell Software, Inc. has introduced DataBoss for Windows, a product designed to develop Windows applications and generate standard C++ code. It integrates menu, window and report design with a relational database and provides instant access to dBase and DataBoss files. Cost: \$695. Kedwell Software, Portsmouth, N.H. (603) 433-4777.



AT 11 A.M. HE WASN'T SURE HOW HE'D EVER WORKED WIT

NOTHING THIS EASY HAS EVER BEEN THIS POWERFUL.

lust because Approach is easy to use doesn't mean it's not powerful. This is a fully relational client/server database that received a perfect 5.0 score from PC Week Labs in both 'ease of use' and 'performance.'**

And with Approach, access to existing databases is only a mouse click away. Our PowerKey™ technology lets you work with dBASE® Paradox, FoxPro,® Oracle® SQL, SQL Server and DB2*** data in its native format. With no filters and no imports involved.

multiple databases and all popular networks with unsurpassed speed and flexibility.

NOTHING THIS POWERFUL HAS EVER BEEN THIS AFFORDABLE – JUST \$99.

For just \$99*** you can experience the database that PC/Computing called 'the most usable Windows™ relational database ever.*** But this great introductory price for new Approach 2.1 won't last forever. Call

1-800-TRADEUP, ext. 9120 today or visit your Lotus Authorized Reseller to take advantage

of this limited time offer And discover the po ful relational database expressly designed for end users. Like Don Glor. And you.





DO YOU SELL OUTSOURCING?

Advertise in Computerworld's Time and Services Classifieds. They work.

800-343-6474

IT'S AMAZING WHAT PEOPLE CAN ACCOMPLISH WHEN THEY WORK TOGETHER.



Competing in today's marketplace requires a tremendous investment in information and technology. Unfortunately, for many organizations, this investment has yet to pay off in a way that significantly benefits their people and organization. The reason? Fragmented, inefficient systems.

We understand the complexities of this situation, including the importance of bringing people and information systems together and doing it economically. Because we're an open systems integrator, we can evaluate your situation objectively and provide you with powerful, tailored solutions—while helping you retain as much of your original information technology investment as possible.

- Like you, we measure success on return on investment and we believe accountability is crucial. We also believe in Brainware," that is, our experience and expertise in integrating the most intelligent, cost effective solutions into an organization.
- Solutions that can help streamline a company. Solutions that often result in extraordinary breakthroughs in productivity. Interested? Call 1-800-257-OPEN. Together, who knows what amazing things we'll accomplish.

CONTROL DATA

The Integration Company

©1993 Control Data Systems, Inc.

No longer just working stiffs, contract programmers are helping to train permanent IS staffs in new technologies

By Julia King

aramount Pictures Corp. is casting contract players. But these hired hands aren't the usual bit players - they're cast in pivotal programming

"There's a wave of new technologies that's accelerating, and we don't have people trained and ready to go now to do new or pilot projects," says Edward Altman,

Paramount's executive director of systems development.

To bridge the gap, Altman hires outside contractors, who in total make up 25% to 33% of Paramount's 100-person information systems development team.

Using contractors is by no means new, of course. IS managers have long hired so-called "rent-a-programmers" from "body shops," the agencies that specialize in providing temporary IS personnel.

What is new, however, is how contractors are used. Instead of hiring contractors to save money or help them cope when shorthanded, many IS managers increasingly use contractors to train permanent staff in new technologies and to build new applications that use these technologies.

That makes the recasting of IS at Paramount more the rule than the exception, according to Neal Hill, a senior analyst at Forrester Research, Inc. in Cambridge, Mass.

According to a Forrester Research study, almost three-fourths of in-house IS professionals simply don't have the expertise in the new tech-



Southern California Gas' Ed Trainor: 'There's not much economic difference in the cost of contractors vs. $employees.\dots With \ the \ benefits \ and \ overhead \ associated \ with \ the \ employee, \ the \ costs \ even \ out.$

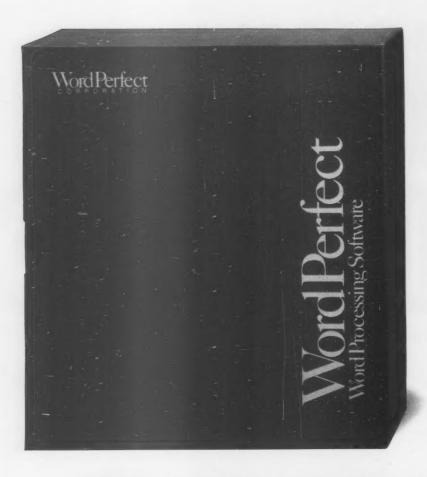
nologies their companies want to deploy. Outside contractors were used at 63% of the companies in a wide range of industries Forrester surveyed.

"As technology curves move faster and faster, IS departments simply can't expect to capture and nurture all the skills they need inhouse," Hill explains. "More than ever, new technologies are being injected into companies by outside service providers."

In greatest demand are contractors skilled in distributed LAN-based technologies, computer-aided software engineering and Unix. Object-oriented programming expertise and client/server development methodologies are also widely sought, says Neal Grunstra, president of Mind Bank Consulting Group, Inc. in Vienna, Va., which provides senior information technology professionals to large companies. Other providers of contractors with leadingedge skills, such as Valinor, Inc. in Manchester, N.H., report growing demand for different combinations of skills.

Contractors, page 116

King is a free-lance technology writer in Ridley Park,



WordPerfe for VMS Systems



Word Processing Software

VMS WORD PROCESSING FOR YES

Whatever the future brings for VAX/VMS users, you can rest assured that WordPerfect® will be



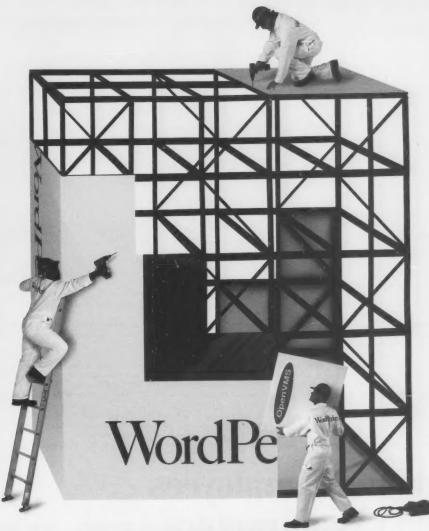
there. We're committed to Digital platforms, including today's VMS and tomorrow's OpenVMS.

For today's VAX user, WordPerfect for VMS offers the same power and flexibility found in our best-selling desktop versions. And we're building a new WordPerfect for OpenVMS so you'll have a choice in the future.



Either way, WordPerfect can help you effectively use your DEC system, preserving the value of your DEC hardware investment.





TERDAY, TODAY, AND TOMORROW.

Unlike other word processors for VMS, versions of WordPerfect are available for a wide variety of different computing platforms, including UNIX, AS/400, DOS, Windows, and Macintosh. With WordPerfect, you can exchange word processing files across systems and platforms without losing important formatting information.



Target Awards Winner for the seventh year in a row.

If you need a word processor for VAX/VMS that will continue to work for you in the future, contact your WordPerfect reseller, systems integrator, or VAR. Or call WordPerfect Corporation

at (800) 526-2649 for more information. We'll show you the future of VMS word processing—for tomorrow and beyond.

WordPerfect[®]

Contractors

CONTINUED FROM PAGE 113

But because most companies implement several new technologies simultaneously, finding contractors with unique combinations of cutting-edge skills is not easy. Agencies that can provide these services have grown rapidly. Mind Bank, for example, earned \$2.8 million from contractor placement in 1991 and expects to hit \$7 million this year, Grunstra says.

Valinor reports that its earnings from software development services alone have doubled in two years.

Applications experts

"I see contractors being used more and more for quick-strike application development," observes Rich Murray, a Los Angeles-based principal at Nolan, Norton & Co., an information technology consultancy based in Boston.

"In the 1970s and '80s," Murray says, "contractors were hired to come in and write Cobol code. Now many are doing very targeted development on specific systems like sales force automation."

Paramount is a good example of a company that uses contractors to keep applications development moving. Caught in a technological squeeze as it evolves from mainframe and minicomputers to network-based client/server systems, Paramount sorely needs programmers experienced in mainframe database and transaction-processing systems. It also needs experts who can develop pilot applications that incorporate distributed technologies like IBM's OS/2 operating



Bose's Tom Charbonneau: 'Employees cannot retrain in newer technologies plus maintain legacy systems at the same time. Neither can contractors.'

system, Novell, Inc.'s NetWare network operating system and Sybase, Inc.'s relational database.

If computer professionals skilled in both established and emerging technologies were readily available, Altman says he'd grab as many as he could.

But like most cost-conscious corporations, "Paramount is loath to hire additional staff," Altman says—especially in view of Paramount's pending merger with Viacom, Inc. "We also don't know if the pilots will survive and what our spe-

cific long-term needs will be, so it's not worth a massive in-house training effort today."

Contractors provide a way to build pilots based on new technologies without investing permanent staff in high-risk projects.

Beyond a demand for those skills, however, is the growing expectation of IS managers that contractors provide onthe-job training in technologies to inhouse employees.

"IS is definitely looking for skills trans-

fer. One of the requirements in many of today's contracts is that contractors make in-house employees smart while building new systems," Hill says.

Contractors are also hired as outsiders by corporations to back-fill positions temporarily vacated by employees sent off-site for training in advanced technologies, Nolan, Norton's Murray says.

"It's just like retooling a factory," says Alan Ditchfield, chief information officer at The Progressive Corp. in Mayfield Heights, Ohio. "You send the regular person out to retrain and a contractor handles things until he gets back." Currently, contractors compose 10% of Progressive's 270-person programming work force, Ditchfield reports.

Overseas savings

Some IS managers who seek to cut personnel costs are using overseas contractors.

Robert Menar, a senior vice president who heads the information services division of Carter Hawley Hale Stores, Inc. in Los Angeles, already knows the savings that using overseas IS expertise can yield. Mainframe CICS programmers in Beijing recently built an entirely new system for the company's catalog mail-order operation in less than six months.

"They're outstanding," Menar says of the Chinese programmers with whom inhouse 15 personnel exchanged system specifications and code via electronic mail. "They produce quality code, and you can buy these programmers for \$22 an hour, which is unbeatable."

Menar and other IS managers peg the hourly rate of U.S. contractors at between \$40 and \$60.

Juggling employees and IS contractors

C

ontractors are making bigger-than-ever contributions to IS departments. But their growing importance creates difficult management issues. Just for starters:

 Whom do you entrust with supporting critical applications that still reside on the mainframe?
 Who is best-suited to

work on new development projects?
• How will giving development to contractors affect employee morale?

IS managers who use contractors must make a choice: Use either new or old technology, not both.

"Employees cannot retrain in newer technologies plus maintain legacy systems at the same time. Neither can contractors," says Tom Charbonneau, manager of corporate IS and business administration at Bose Corp. in Framingham, Mass. Under the gun to get new distributed systems out the door fast, IS management must decide which group is best qualified to each set of tasks and then "strike a careful balance between the skills and knowledge of both groups," Charbonneau says. "There's no question that it's difficult to manage two different types of people."

Employees concerned about job security are naturally apprehensive about turning over any work, especially new development, to outsiders. Contractors, meanwhile, have little native knowledge of legacy systems. That makes outsiders an illogical choice as custodians of mainframe-based applications.

However, "employees with a long-term relationship with the company get nervous if they get pushed into maintenance and see contractors getting to work on what they consider the good stuff," Charbonneau says. "There's also the worry that if a contractor leaves without properly training employees, you're stuck."

Charbonneau's solution: Assign all contractors some maintenance responsibilities. He also earmarks 30% of all IS employees' time on the job for retraining.

"We're using contractors to do Unix and client/server development, and it always crops up that employees will be uneasy," he says. "You have to reassure employees that they're not being left in the dust. You have to manage that as a person. That means meeting with employees and explaining what's going on."

At Southern California Gas, vice presi-

dent of IS Ed Trainor is using a combination of training and financial incentives to keep up employee morale during the transition from mainframe to client/ server systems.

Currently, the gas company's 500-person IS department relies heavily on contractors for developing client/server applications. About 100 IS contractors work there. But, as Trainor sees it, the company still has a duty to retrain IS employees in emerging technologies, even though it plans to cut staff once these

TIPS FOR MANAGING CONTRACTOR TALENT

- Plan ahead. Finding contract developers with the unique combination of skills you need will take time and research.
- Require both independents and those who work for agencies to sign an agreement setting forth their exact relationship with your company, specific work requirements and deliverables and the conditions under which they can be terminated.
- Process payments via purchase orders, which can be tracked through the accounting process.
- Pay by the project rather than an hourly or weekly rate.
- Set forth in writing specific expectations regarding training of in-house employees.
- Delegate responsibility for overseeing skills transfer to a particular employee project manager.
- Familiarize yourself with IRS guidelines concerning workers' status.

Yet in these days of buckling IS budgets, many IS managers don't seem to be troubled by the fees they are charged by the agencies that supply contractors.

Many managers regard the flexibility to engage technology-savvy contractors on an as-needed basis well worth the pre mium hourly rates they pay for them.

'You typically look at costs over the life

"The idea," he says, "is to spend money wisely and maximize your return. You can always buy cheap, but this is not the primary motivator for using contractors. My goal is to get the most productivity out of the dollars spent on IS.

Contractors vs. employees

Still other managers say that higher

hourly rates don't necessarily translate into higher costs.

Once the cost of fringe benefits, payroll taxes and other expenses associated with employees are figured in, contractors cost about the same, or sometimes even less, than employees, they say. In the long run, hiring contractors may even be more cost-effective than hiring full-time employees.

There's not much economic difference in the cost of contractors vs. employees. You may be bringing in an employee at \$50,000 a year and a contractor at \$100,000, but with the benefits and overhead associated with the employee, the costs even out," says Ed Trainor,

vice president of IS at Southern Califor-

"The employee has jury duty, maternity leave and training, and due to all of these things, employees are between 75% and 80% productive," Trainor says.

"Contractors are only paid when they are working. When you do the arithmetic, there's not much difference. They're relatively substitutable.'

AT ARE YOU USING CONTRACTORS FO

Data center operations 33% Client/server development

Percent of companies lultiple answers allowed) Base: 50 Fortune 1,000 companies

18%

rester Research, Inc., Cambridge, Mass

cycle — a year's salary plus benefits vs. the cost of the project," says Gary Senese, vice president for MIS at Rubbermaid Commercial Products, Inc. in Winchester, Va.

When you calculate costs this way, Senese says, "The per-hour costs are probably similar. The biggest thing I get as a manager is flexibility to add and subtract resources as needed.

technologies are fully deployed.

"If we left our employees to work only in the existing environment, they wouldn't be skilled at cutover time, and we felt it was our obligation to give them a chance to be competitive," he says. "The other option would have been to downsize now and try to guess who would be competitive and who wouldn't a year from now. Frankly, our crystal ball just isn't that good."

So, for the time being, the gas company keeps all its staffers. Moreover, to sustain their morale, the company financially rewards those assigned to maintain the legacy applications they know will be put out to pasture.

Trainor says the company is also exploring the possibility of permanently contracting this type of maintenance to overseas programmers. "We already know what the potential [for savings] might be and it's really quite large, large enough to warrant the next level of study," he says.

Motivating factors

But paying contractors is one thing; motivating them to produce consistently high-quality work is quite another. And it's an issue IS managers should consider. After all, managers don't have to worry about paving contractors' path to the top of their profession.

Indeed, outsiders' career concerns, unlike those of employees, are of little interest to the IS managers who hire them.

'Frankly, I'm not all that concerned about [contractors'] careers. That's one of the things you get a lot colder about," says a systems development manager at a \$1 billion specialty clothing company who requested anonymity. "If you need them to go program, you tell them to program and you let their [agency] management worry about their careers

Progressive's CIO, Alan Ditchfield, is equally blunt on the issue. "If a contractor isn't motivated, you get rid of him."

Different incentives

On the other hand, what managers give up with contractors is the power to use performance review as an incentive, notes Gary Senese, vice president of MIS at Rubbermaid Commercial Products. Rubbermaid's 10 IS employees serve as project managers in charge of an evershifting population of specialized con-

"One of the first challenges for inhouse project managers is learning how to manage contractors who aren't part of the team and who don't have the same incentives as they themselves do," Senese says. "There's a different set of management skills necessary, and we're still learning how to do this." — Julia King

Who's a contractor? IRS cracks down

f you're interested in hiring contractors, the Internal Revenue Service is interested, too. And the agency is cracking down on companies that misclassify contractors.

Robin Mattern, a contract programmer who has worked for the same client every day for two years, is exactly the kind of worker that has piqued the interest of the IRS.

The agency's 5-year-old Employee Tax Examinations (ETE) unit specializes in investigating contract workers and the companies that hire them. The unit's goal, IRS spokesman Don Roberts says, is not to declare war on independent contractors but rather to make sure that people who are employees are treated as such. Misclassifying employees as contractors puts workers at a disadvantage and employers at an unfair competitive advantage."

For companies such as Mattern's current employer, an advantage of hiring contractors is the huge savings that can accrue in payroll and other taxes, none of which applies to contractors.

Companies whose labor force consists entirely of emplovees, on the other hand. are required to pay not only income taxes but also Social Security and workers' compensation insurance.

Since ETE's inception, the IRS has snared more and more companies that have taken the contractor short-

Thousands reclassified

The agency says that in fiscal 1992, ETE reclassified 90,000 independent contractors as employees. During that year, Roberts says, the IRS disposed of 1,700 cases. Another 9,000 cases were closed without the IRS' opening an audit. In many cases, he says, companies agree with the IRS auditors' findings, and only a "small amount" of cases are contested.

One contested case concerned Mind Bank Consulting Group, which provides high-level IS professionals on a shortterm basis to Fortune 1,000 companies

Mind Bank President Neal Grunstra says the IRS audited his company four years ago on the contractor/employee issue, wanting to reclassify 33 workers and collect \$250,000 in fines and back taxes. Grunstra says his company appealed the case and won.

Managers concerned about the status of people working for them can allay

their doubts by consulting IRS guidelines. The IRS offers a 20-point checklist that it uses internally to resolve employment status disputes.

Checklist topics range from the kinds of equipment or tools a company provides a worker to the location of the work site to how a worker is compensated.

For example, employees, rather than contractors, usually work on company premises or at a location designated by a company, according to the IRS. Also, employees usually work during hours specified by an employer. Independent contractors, on the other hand, generally set their own hours, according to the guide-

The checklist is available by telephoning (800) TAX-FORM and requesting IRS Publication No. 937, titled "Employee Taxes and Information Returns.'

Take precautions

In addition to familiarizing themselves with the IRS guidelines, companies

should take additional steps to protect against run-ins with the IRS, advises IS manager Tom Charbonneau at Bose Corp. in Framingham, Mass. His recommendations include the following:

·Hire contractors only through contracting agencies, which are responsible for paying all appropriate taxes

•Require every contractor to sign an agreement that details the exact relationship between worker and company and spells out work requirements and deliverables

·Process contractor payments via purchase orders

rather check requests. "You also need to be very careful about providing contractors with space because this could be construed by the IRS that they are employees," Charbonneau warns. "Preferably, you want contractors to work off site and check in with

At Southern California Gas, Vice President of IS Ed Trainor hires contractors only through agencies. Independents, he says, place companies at a higher risk to IRS exposure.

"You may be preparing a[n] [IRS form] 1099 for a contractor, who in turn may not be paying taxes," Trainor says. "The IRS then applies its employee-vs.-contractor test, and it's theoretically possible that a contractor could claim that they were actually an employee. For that reason alone, we bring in contractors only through agencies.'

-Julia King

If this is how

your computer

does Windows,

have we got a

PC for you.

Don't wait. Put one of our Image™ Series 486 PCs on your desk immediately. You'll get Windows performance that really screams.

And we're not the only ones who



NEC pioneered local bus video technology to speed up graphics-based applications like Windows. Today, as other makers develop first-generation local bus video, we offer advanced, second-generation technology.

feel that way. In a recent review of the Image Series, PC World wrote, "Say goodbye to waiting in Windows."

Making it fast.

Our ingenious Image Video™ technology com-

bines second-generation local bus video with a powerful graphics accelerator, so even the most complex, most demanding graphics applications run full blast. And with our True Color support for over

16.8 million colors and photo-realistic images, those applications will have the impact of a speeding freight train. The bottom line: Your produc-

tivity takes a fast turn skyward. Our new Image PCs are built for easy, 238-pin ZIF-socket upgrades to the next generation of Pentium-based Intel OverDrive™ processors. We've also given them an on-board SCSI II interface, for quick connections to a wide range of peripherals.

NEC totage 433

But wait: it gets even better.

In addition, NEC's OptiBus™ technology can make those peripherals perform up to 30% faster than ordinary systems. While our ImageSync™



feature delivers flawless, flicker-free images with no adjusting when used with one of our award-winning MultiSync® FG™ monitors.

The NEC Image Series. Just part of a whole family of great personal computers, from our affordable PowerMate® PCs, to our expandable Express™ servers. So (why wait?), call 1-800-NEC-INFO or NEC FastFacts™ at 1-800-366-0476, request document 46243.









Because f is the way you want to go.





Simplified Solutions For Complex Business Communications

When one source offers a complete list of business applications and services, even the most complex communications issues become simpler. Critical information reaches the right people at the right time. Speed, productivity, and customer service move from buzzwords to reality. Check it out in the press. Then call BT.™ Ask for our *Alliance* stories,

customers' solutions simplified. 1-800-872-7654 (U.S.), or 1-800-874-7654 (Canada).

Going Further Staying Closer"

Integration Strategies

Games integrators

The stakes are high. So, of good and capable companies out there.

... the way to guarantee you come out a winner is to know the bluffs – and



hen Ron Finlason took a look at the bid in front of him, he did some quick arithmetic and decided his company didn't need a Big 5 accounting firm to do what it could do for itself at 35% to 40% less.

Finlason's company, The Harper Group, was on the verge of hiring

By Abby the consulting and systems integration subsidiary of a

national accounting firm for a very large project, when he appeared on the scene. The firm had been on-site for about six months already conducting a needs assessment and analysis. When a

recommendation was finally produced, executives at the San Francisco freight and import/export company realized they weren't qualified to judge its merits. That's one of the things they hired Finlason to do oversee integration and re-engineering efforts and interpret the recommendations of big-ticket integrators.

Finlason's interpretation was simple:



way too much markup.

"The problem I had with their bid and the others we got was their billing model, their overhead," he says. "A big chunk of their bid included \$80 to \$90 an hour for the 'grunts' who were going to do the basic code. But the going rate for that kind of work is \$50 to \$60 an hour."

The Harper Group's Ron Finlason recommended that his air freight firm rejectan Integrator's sky-high bid and tackle most of the re-engineering work itself

Games, page 122

Games

CONTINUED FROM PAGE 121

Based on Finlason's recommendation, The Harper Group decided to do the bulk of the work itself, including linking seven disparate freight-tracking systems located at offices around the world. When outside help is needed, the company hires systems analysts and programmers on an as-needed basis for \$50 to \$60 an hour.

Do-it-yourself is not an option for many companies, and it wouldn't be appropriate in a lot of circumstances, but many companies that work with systems integrators say it's a relationship fraught with danger for the unwary and naive. You have to know exactly what you need, negotiate hard to get it, and keep your eyes open through the whole process.

Some of the most bitter complaints about integrators have nothing to do with the size of their bills. What customers and industry experts peg as the biggest problems are inflated claims of expertise in their busiindustry, ness or boasts of technical know-how that turn out to be illusory and bait and switch taetics that leave you without the promised technical talent.

"We know your business'

For the most part, systems integrators are not trying to deceive you, but face it: They want to sell you a service, and sometimes selling means apply-

ing a little can-doism. It's up to you to probe backgrounds, ask hard questions and, if the integrator seems ideal in every way but this, write the contract so they, not you, bear the cost of their education.

That's exactly what KFC Corp. and Taco Bell, two of Pepsico, Inc.'s



Bill Soper Chevron Canada

Staff changes can cost you time.

fast food businesses. did when they decided to hire Ottawabased SHL Systemhouse. Inc. to design a (POS) point-of-sale system for their restaurants in North America, SHL Systemhouse had no particular background in the fast food industry.

But as Audrey Broska, strategic consultant to the information technology group at Taco Bell and project executive on the POS job, says, the firm did have other important attributes: worldwide organiza-

tion to support the companies' interest in global POS development and expertise in open systems and object-oriented design. Solution: stipulate up front that the integrator must learn the fast food business at its own expense

According to Michelle Wells, sys-

tems development manager at KFC, members of the SHL Systemhouse team have become a familiar sight at KFC's research and development restaurants, where they do the jobs they are trying to automate and integrate.

SHL Systemhouse hands have also put in time inventorying food and restaurant supplies, making tacos taking orders and ringing up sales at Taco Bell restaurants in Southern California. This onsite labor was a specific stipulation of the agreement, as was SHL Systemhouse's hiring of a quick service consultant for lessons in fast food business, Broska says.

'If you don't know what it's like to have 50 high school kids in front of you in the restaurant, you don't know how to design the systems [to] be intuitive," she says

Live experience with the work process and the environment cannot be overvalued, says John Parkinson, a managing partner at Ernst & Young. Parkinson says there are several financial institu-

Games, page 125

The games you play



By Susan Scrupski

K, now that you've heard all about the problems you want to avoid, you may be thinking that, as a group, systems integrators are a) incompetent b) arrogant c) sharks or d) all of the above

If any of those were accurate de-

scriptions of even a sizable segment of integrators, this service category would be headed toward extinction instead of growing by double

Integrators don't deny projects can run into problems - sometimes big ones - but they do maintain that customers have to assume part of the blame. Integrators insist that on many

projects, they are placed in impossible situations that guarantee failure. In those situations, they say it's the customer - not the integrator that sabotages the project and often the relationship.

Clarity called for

The biggest stumbling block, integrators agree, can be a client's failure to formulate clear business goals. "The person asking for the integration must explain the business objectives," savs Peter Abene, director of corporate marketing at Electronic Data Systems Corp. This means not only the basics of what you want to accomplish, he says, but also a full description of the environment in which the system will be used.

Abene gives an example of an in-

tegrator that has met all the technical specifications in a contract only to discover, after the project's completion, that end users had expected laptops, not desktop PCs. "If that kind of information didn't get carried through into the technical specifications, [then] you didn't meet the business objectives, and the project could be considered a failure," he says.

Customers also frequently discount the training that will be required to take advantage of a new system, Abene says.

A related problem, integrators say, is customers' failure to understand that, at some point, planning must end in a firm commitment to specifications. A poorly defined

scope is "a major roadblock," according to Doug Catalano, president at CSC Partners. "You're asked to do a job that is reasonably specific, and during the deployment

state, the client begins to ask for more functionality.

This kind of back-end loading of extra requests is more than a nuisance: it has big cost implications and can poison a good relationship. Michael Drury, Hewlett-Packard Co.'s project services manager at the company's professional services organization, explains. "It's particularly difficult when the client doesn't agree that what they are requesting is a change in scope but contend it is 'clarification' of



Peter Abene EDS

Customers sometimes leave out important details, such asthefact thatend usersare expecting laptops, not desktop

systems.

things," What the client doesn't realize, he says, is that a 10-minute software rewrite can affect countless other tasks in the project One thing customers definitely

should tell integrators but often don't, they say, is exactly what the political stakes are. "Too many times, a project is sold [internally] like a product," says Vince Chickillo, marketing operations manager at Digital Equipment Corp. People aren't cognizant of how deep the trouble can go if everyone involved isn't fully apprised of what's at stake, he says.

On a related note, the people who will actually be using the system are often not mentioned - and sometimes not even consulted about what they want and need. Chickillo says that if the decision maker is different from the end user, trouble often follows.

'Sometimes [the end users] have no clue; they're not even asked to participate," he says. In fact, according to Dennis McGuire,

a consultant who regularly advises clients on integration contracts, "The No. 1 problem [when contracts run awry] is when users do not adequately support the project.'

Another sure project killer is inadequate staff resources on the customer side. Drury says. "You're always dependent to some extent on the client's resources, even if it's just to ask questions," he notes. "But it's often the case that they're too busy to help you with a project they committed to."

Scrupski is president of SS Consulting and editor of the newsletter "The Integrator," based in Barnegat, N.J.

Doug Catalano **CSC Partners**

ask for more functionality isnotwhen the system is ready to be deployed.

Hardware compression with or without the extra gear

An enterprise-wide solution available now — DATA PACKER®



You've got to have extra gear to get hardware compression — processor and software upgrades and ESCON cabling. And even then you may not be able to deliver the benefit across your enterprise. But now, you can pick up the benefits of hardware compression with or without all the gear — with DATA PACKER® from BMC Software, Inc.

Up to 80%

DATA PACKER can achieve compression up to 80% by exploiting the hardware compression facility of IBM®'s newest ES/9000 processors. Or, when

hardware is not available, it provides software emulation.

Plus, by offering four additional compression algorithms,
DATA PACKER can give you compression up to 90%, depending on your data.

Across your enterprise

DATA PACKER's method of hardware compression also can be used across multiple CPUs, giving you an enterprisewide compression solution

with or without the extra

hardware.

Excellent compression. Across your enterprise. For all major platforms — MVS, DB2®, IMS and VSAM. And with DATA PACKER you never need to worry that your mission-critical data is put at risk. All available today.

To find out more, call BMC Software at 713 240-8800 or **1 800 841-2031**.



The Experience. The Technology. The Future.

BMC Software international offices are located in Australia, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, Spain and the United Kingdom BMC Software is a registered trademark of BMC Software, Inc. IBM and DB2 are registered trademarks of IBM Corp. All office products and Irade names mentioned herein an international configuration of the Commission of the Commission of the Commission of Island Corp. Software Inc. All rights responsed.



The world's #1 network computing show.

The world's #1 multimedia show.

The world's #1 OEM sources show.

The world's #1 office systems show.

The world's #1 IT event for resellers and corporate decision makers.

- Over 2,000 exhibitors—see it all on the industry's biggest show floor!
- Thousands of new products—discover the latest integrated solutions to make your business more productive!
- 90-session conference—follow the experts to more productivity!
- **Keynote** from Apple's President and CEO, Michael Spindler!
- CEO Perspectives from Microsoft's Bill Gates, Sun's Scott McNealy and Computer Associates' Charles Wang!

REGISTER TODAY BY FAX — CALL 617-449-5554!

Receive your registration form by fax—and reserve your hotel accommodations while they last!

Call 617-449-5554, enter Code 31 and key in your fax number —we'll fax your registration form within 24 hours!

< 1983 The Interface Group > 300 First Avenue, Needham, MA 02194-2722 US



©COMDEX/Fall'93

November 15-19, 1993 Las Vegas, Nevada USA

More Up-to-the-Minute News! 51 Issues for \$48 Now Only \$42.95 COMPUTERWORLD

Yes, I want more. I accept your offer of \$42.95* for 51 weekly issues. That's a savings of over \$5.00 off the basic subscription rate.

First Name	MI	Last Name	
Title	Company		
Address			
City	State	Zip	

* U.S. Only. Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

- BUSINESS/MPUUSTRY (Circle one)
 Manufacturer (other than computer)
 FinanchinsarianoReal Estate
 Medical/Law/Education
 Medical/Law/Education
 Mortical Estate
 Substances Service (except DP)
 Government State/Federal/Local
 Communications Systems/Public Utilities/Transportal
 Manufacturer of Computers, Computer-Relited Systems
 Memory Computers, Computer-Relited Systems
 Memory Computers (Computer Relited Systems
 Memory Computers)
 - Manuacturer of computers, Computer-Heaters Systems or Peripherals
 System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
 Computer/Peripheral Dealer/Dist./Retailer
 Other
 Other
 - - (Please Specify)



- 2. TTLE/FUNCTION (Circle une)
 IRANS/UP HANAGENERY
 II O: Circle Internation Officer/Uce President/Asst. VP
 ISAMIS/UP Management
 2. Dr. Afgr. (MS Services, Information Center
 22. Dr. Afgr. (MS Services, Information Center
 22. Dr. Afgr. (Tech. Penning, Adm. Svez., Calat/Fele Comm.
 Networks, Sys. (Mgr. LAM May, PC Migr.
 23. Dr. Afgr. (Sys. Mgr. LAM May, College Developers
 4. Engineering, Management, Software Developers
 4. Engineering, Str. (Portical Migr.
 3. Sys. Integrations/VARs/ Consulting Migr.
 - Are you involved in the purchase or use of the following (Circle all that apply.)
 Networking/Communication Equipment
 Pos/Montsiations
 Large Scale/Midrange Systems
 Software
 Peripherals

 - CORPORATE MANAGEMENT
 11. President, Owner/Partner, General Mgr.
 12. Vice President, Asst. VP
 13. Treasurer, Controller, Financial Officer

E4339-X

More Desktop Computing! 51 Issues for \$48 Now 942.95

Yes, I want more. I accept your offer of \$42.95* for 51 weekly issues. That's a savings of over \$5.00 off the basic subscription rate.

First Name	MI	Last Name	
Title	Company		
Address			
City	State	Zip	

Address Shown: Home Business New Renew Basic Rate: \$48 per year U.S. Only. Canada \$74,97, Central/South America \$130, Europe \$195, all other countries \$295.
 Foreign orders must be prepaid in U.S. dollars.

Please complete the questions below to qualify for this special rate.

- 1. BUSINESS/INDUSTRY (Circle one)

- BUSINESSAMUSTRY (Circle one)
 10. Mandicature (Other than computer)
 20. Finance/Insurance/Real Estate
 30. Medical/Leve/Guszlion
 40. Wholesale/Retail/Trade
 60. Business Service (accept DP)
 60. Business Service (accept DP)
 60. Soverment* State Petra Int. doc. Utilities/Transportation
 60. Soverment* State Petra Int. doc. Utilities/Transportation
 60. Manufacture of Computers Computer Relating/Agriculture
 60. Manufacture of Computers, Computer Service Bureaux,
 50 System Integrators, VARs, Computer Service
 60. Computer Penaning & Conculting Services
 61. Other
- - (Please Specify)

COMPUTERWORLD etting off ATM prices fall

IIIM setting off subsequent to raise ATM prices fall

В

- Are you involved in the purchase or use of the following: (Circle all that apply.)

 a. Networking/Communication Equipment

E4339-X

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55

MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P O BOX 2044 MARION OHIO 43306-4144 NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS MAIL

PERMIT NO. 55

MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P O BOX 2044 MARION OHIO 43306-4144 NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES



Games

CONTINUED FROM PAGE 122

tions that would be a lot better off today if they had done what KFC and Taco Bell are doing. These financial powerhouses "sunk hundreds of millions of dollars into systems integration projects, only to wind up scrapping them." How could that happen? In most cases, Parkinson says, the problem isn't the technology but the fact that the end result just wasn't suitable for the business environment.

"We have tech talent"

If you hear that line, you owe it to yourself to swallow it with a grain of salt. Mike Corey, vice president at Database Technologies, a Sudbury, Mass., consultancy, says technical virtuosos are spread pretty thin across the industry these days. "Even the biggest systems integrators are scrambling fortalent," he says.

Limitations are particularly pronounced in terms of experience with new software and development tools. Preliminary screening of potential contractors is crucial. In fact, many firms are starting to interview each member of an integrator's proposed team as if each were a prospective employee. Others are suggesting that integrators let their team members learn new tools on their sites before the meter starts running.

That was the gist of an agreement Kaiser Permanente, a health care firm in Oakland, Calif., struck with the integrator it hired for a multimillion-dollar, four-year, payroll/personnel project.

We hired them under very specific conditions," says Barbara Beck, manager of systems development at Kaiser. "They had a oneto two-week grace period to learn the technology needed for the systems design and development. We didn't pay the staff that worked on the project until they were up to speed.'

"We're here to stay"

Frequently, customers say, the integration team you start with - or think you're starting with - is not the one you wind up with.

Staff switches are most common on longer, more complex projects. Partway through, experienced contract staffers may be replaced with less seasoned workers. This slows down completion of a project. Right now, Bill Soper, MIS manager at Chevron Canada Ltd., is concerned about hanging on to the



KFC's Michelle Wells: Integrators were put to work behind the counter, performing the very POS tasks they were hired to automate and integrate

Survivaltips



By Vicki Hudson

lmost every IS professional has at least one systems integration war story. Most of us have several.

After the dust has settled and the consultants have departed, project processes are reviewed to figure out where things began to slip. Invari-

ably, that question leads back to the beginning of the project, to the point where confusion was first sown and IS loosened its grip and stopped actively managing the process.

Based on many projects I've watched and a few I've experienced, I see a pattern to the way in which projects go wrong. What follows is a composite of the most common mistakes.

Our task is to replace almost half of the existing business applications, which cut across nearly every department. This is the largest IS effort attempted in several years.

Before any decisions are made, lengthy discussions are held, and an attempt is made to plan for every contingency. Inevitably, however, things are missed and misunderstood.

The software that is purchased meets requirements and is clearly the best choice in terms of price and functionality. The vendor is available and willing to make any necessary alterations. The problem is, the firm is small and unaccustomed to working with an organization as large as ours. It will clearly need a lot of help.

How to keep the boat afloat

- · Define your expectations in writing.
- · Invest in project and contingency planning. · Recognize that you, not the integrator, own
- the problem you're trying to solve
- · Believe what is written and nothing more.
- . Don't assume the integrator can figure out your culture, organization and existing applications. Involve as many of your people as possible - IS staffers and end users.
- · Apply quality and project management procedures - task tracking, change management, etc. - from Day 1.
- . Don't assume the staff involved in the sales effort will be the same staff assigned to your project.
- · Take the time to review deliverables periodically and to make sure you know how end users think things are progressing.

A reputable, experienced consulting group is selected to oversee the project. It vows to assemble the best possible team quickly and assures us that this team will be flexible in its approach to our problem. Our IS group relaxes and decides that the project is in safe hands.

Several internal staffers are assigned to the team but only part-time. Their skills are required to keep the existing systems running.

Little documentation exists on the business processes and applications in existence, and no serious attempt to create it has been made, which leads to underestimation of the scope of changes and makes effective management of organizational change impossible.

Because the goal is to change the business, a heavy commitment of time and effort is required from users, but little attention is paid to selling the idea of the project and participation in it throughout the organization. No one really has a clear view of how much this will all take.

The consultants move in and begin asking questions - more questions, requiring more time than anyone has really anticipated.

The users, who have never been involved in a systems development effort before, receive little guidance in project management or normal development processes. This will mean modifications after the system is put into production.

Managing the number of changes deemed critical becomes an awesome task, and the softvare vendor can't keep pace. The quality of the delivered software suffers. Acceptance testing becomes a major responsibility.

Staff changes, technology issues and philo-



differences sophical among the consultants, the vendor and the internal staff cause delays that impact both the schedule and the final product. The job gets done, but no one will call it a success.

Hudson is director of technology planning and management at The U.S. Shoe Corp. in Cincinnati.

RON GLOVER
PRESIDENT

DSB

NORTH AMERICA

ON VIDEO SOLUTIONS?

CALL

CALL

1-800-846-2355

I'LL TELL YOU

BELL ATLANTIC'S A

SMART BUSINESS MOVE

We're Dun & Bradstreet Information Services, N.A. The leader in providing information to help businesses make more profitable decisions. One of the best business decisions we made was selecting the companies of Bell Atlantic* to meet our internal videoconferencing needs. To make us totally comfortable with the benefits of the technology, they proposed a 12-month trial. In just four months, Bell Atlantic had a turnkey, enterprise-wide, videoconferencing system up-and-running, linking nine offices across the country. And we're already seeing the results. The ability to call videoconferences together at a moment's notice and to bring expertise together from around the country is making Dun & Bradstreet more responsive. We're working smarter, solving problems and finishing projects faster. At Dun & Bradstreet Information Services, we help companies realize their potential with information to make better business decisions. Bell Atlantic showed us how to reach our potential with custom videoconferencing solutions. So, give me a call, I'll tell you how Bell Atlantic is helping to keep Dun & Bradstreet Information Services on the forefront of communications technology.



Who's who

f you want to hire an integrator, don't worry about limited selection. There's a mind-boggling variety of players competing for this kind of business right now.

In fact, your biggest problem is going to be sorting out the options.

To help you cut through the confusion, we've identified the major types of providers and some of their strengths and weaknesses. We've also included examples of companies that fit these categories. Here's how they sort out:

MANAGEMENT CONSULTING FIRMS

These are business consultants with considerable industry and "process" expertise. Lean toward these firms if you're in the market for strategic business process rethinking. But proceed with caution: One recent study by International Data Corp. reports that these firms are sometimes far less technically capable than they would lead you to believe. Exceptions here might be companies such as CSC Index, Inc. (which can lay as much claim to the re-engineering movement as Michael Hammer) and Booz Allen & Hamilton, Inc., which has its own commercial information systems group.

Examples: McKinsey & Co., Boston Consulting Group, Bain & Co., Monitor Co., Arthur D. Little, Inc.

► LARGE ACCOUNTING FIRMS

In this instance, you might think of these as the Big 5, as Andersen Consulting has moved so far from its accounting roots. The information technology practices of large accounting firms have impressive technical credentials and a generous number of high-profile accounts. Most of these firms have specialties in emerging technologies and an understanding of how to apply them to industry-specific business processes.

Examples: Ernst & Young, Coopers & Lybrand, Price Waterhouse, KPMG Peat Marwick, Deloitte & Touche.

► LARGE MULTISERVICE FIRMS

These companies represent your classic systems integrators: large (more than a billion in revenue), independent firms that provide a full spectrum of services, from strategic consulting and business process reengineering to facilities management, sometimes through a variety of divisions or subsidiaries. For example, Computer Sciences Corp. provides management consulting through CSC Index, systems integration through CSC Partners and large-scale commercial facilities management contracts through its Industry Services Group. The greatest advantage in working with a large, well-known company is the low risk of default on contract commitments.

 $\label{lem:corp.} Examples: Electronic Data Systems Corp., CSC Index, Integrated Systems Solutions Corp., Andersen Consulting.$

► SMALL MULTISERVICE FIRMS

There is less diversity among the smaller services pro-

viders. These companies will offer a full suite of services but often specialize in one area. One advantage in working with small firms is that management will respond quickly to client requests and will generally commit more senior people to projects. Many of the companies in this category will be in the big leagues in a few years.

Examples: Technology Solutions Corp., Perot Systems Corp., SHL Systemhouse, Inc., American Management Systems, Inc., Logica NA.

► SMALL NICHE/BOUTIQUE FIRMS

The hottest emerging integrators in the market today are found in this category. Whether it's client/server migration, object-oriented application development, wireless LAN solutions, computer-aided software engineering or imaging technology, these firms generally carve out specialized niches. This group has some of the best expertise in emerging technologies and is usually quite good at transferring these skills to customers' staffs.

Examples: BSG, Innovative Information Systems, Inc., Lante Corp., Trident Systems, Inc., Fisery, Inc.

NETWORK COMMUNICATIONS VENDORS

If it is an advanced enterprisewide network you're after, communications vendors are well-positioned to help you build and manage intelligent and expandable connections. Advantages include good technical credentials and a grasp of data, voice and video communications.

Examples: AT&T, MCI Communications Corp., Sprint Corp., WilTel, Advantis, Syncordia, the regional Bell operating companies.

► SYSTEMS AND SOFTWARE VENDORS

A staggering number of product manufacturers are starting up independent integration and services organizations. The extent of bias toward the vendor's own products varies. Some companies candidly position their consulting arms as inclined to use their own products, while others seek true independence. Most do lean, to some degree, toward their parent's offerings. Using a vendor's systems integration unit can make a lot of sense if you have a substantial investment in it. You may even find that it will work harder to please so it doesn't lose your systems business.

Examples: IBM, Digital Equipment Corp., HP Professional Services Organization, Oracle Consulting, Microsoft Consulting Services, Lotus Consulting.

NETWORK INTEGRATORS

This group contains a couple of subcategories. The bigger segment is LAN resellers offering network integration services. Complex LAN-to-LAN networking is their primary focus, although many also handle multiplatform networking, groupware and client/server application development.

The second type, which goes by the name of network systems integrator, is something of a hybrid. Typically, such a firm is comfortable in network technology but goes beyond that to provide project management and ongoing support of complex, inter-LAN networks.

Examples of Type 1: USConnect, LANSystems, Inc., Data Systems Network Corp., Network Management, Inc., The Asset Group. Type 2: Syntrex Technologies, Inc.

-Susan Scrupski

Games

CONTINUED FROM PAGE 125

team that's been working with him for two years on a \$7 million order entry and gas delivery system, due to be completed in four years. "Changing staff can cost you months of productivity," he says. It can take three to six months, depending on the project, to orient new integration staff, Soper says. Chevron estimates that this can actually cost upward of \$6,000 a month.

Soper says he is hopeful he'll be able to retain most of the top integration staffers because "it is a good, high-visibility job, a good reference account that will help them get more work." Still, he says, in the future he'll stipulate staff tenure at the outset.

However, writing rules into the contract may not make a lot of difference. Beek has tried writing contract terms focused on keeping specific people and laying down rules for staff replacements but says this "continues to be a common hazard for any long project."

"We know what's best"

The best protection against a bad experience with an integrator is knowledge of what's needed, the going rates for services, the kinds of technologies that could be applied and how to assess the quality of deliverables.

Some firms use consultants to interpret and evaluate what integrators are proposing and doing. Others hire or appoint a permanent employee to do it. In either case, the scope of the job is not only watch-dogging the integrator but also making provisions for important matters such as skills transfer.

Many companies that work with integrators say it's a relationship fraught with danger for the unwary and naive.

"There are many cases where no one in the user organization knows how to use the new systems designed and installed by the systems integrator," Parkinson says. "During the course of the integration project, users have to learn how to take advantage of the new capabilities or decide to outsource. Otherwise, they become hostages of the systems."

Neglecting training and maintenance issues can also produce some major unforeseen costs. Parkinson points to the experience of Schroeders, a London merchant bank that hired a systems integrator to work on a two-year, \$12 million contract. The integrator designed a new development environment and database and converted many of the systems to a new operating system, he says, but no provisions were made for maintenance or the training of Schroeders' information systems staff.

As a result, the company had to ask its integration firm to return to conduct training and run maintenance. The integrator worked out a \$4 million deal with Schroeders to do on-call maintenance and training for one year.

Parkinson recommends that clients build in critical services when negotiating contracts to avoid staff problems such as low morale, as well as to avoid drawing up costly last-minute contracts.

Christopher is a free-lance writer based in Somerville, Mass.

At Unisys, three open client/server platforms provide you with options.

Because offering just one doesn't give you an option.

To help you build your business, an open client/server platform is



a basic tool. To help you choose the right tool for the job, Unisys

offers three powerful, open client/server systems.

Our **U Series** UNIX systems are outstanding servers and workstations for commercial applications—and they offer comprehensive LAN and WAN internetworking capabilities.

PW² Advantage Series PCs are the perfect choice to support personal productivity and executive applications within a network. They are MS Windows-ready and can support network-transparent communications not only for MS Windows but also for NetWare, OS/2, SCO and Windows NT.

CTOS is an internationally proven system tailored for customer service. With a dramatically low cost of



administration, it's ideal for replicated client/server applications. And all

UNISYS
We make it happen.

Unisys client/server systems are powered by Intel microprocessors.

Call Unisys at 1-800-874-8647, ext. 189. Ask how a choice of our open client/server solutions can help you hit the nail on the head.

NetWare is a registered trademark of Novell, Inc OS/2 is a registered trademark of IBM. SCO is a trademark of the Santa Cruz Operation The Intel Inside Logo is a trademark of Intel Coi

©1993 Unisys Corp. PW* is a trademark of Unisys Corp.
UNIX is a registered trademark of UNIX System Labs, Inc.
CTOS is a registered trademark of Convergent Technologies, Inc.
MS Windows is a trademark of Microsoft Corp.

ls there a way to net branches without



work your company shaking the tree?

So you've got PCs in your branch offices just waiting to be networked. But you're waiting for a solution that won't involve four different products, four different vendors, and forty days and nights of training ignitive just trying to get it all to work together.

> Introducing NetWare Branch Office Solutions, the first integrated networking package for branch office PC environments.

Now, without going out on a limb, you can network your branch offices, link them to each other and to your corporate network, and manage it all from one location. Training and support are simplified, too, since Novell is the only company you need to work with.

For additional information and a free video, give us a call at 1-800-554-4446.

NOVELL. The Past, Present, and Future of Network Computing.



NetWare **Branch Office** Solutions

Everything you'll need to network your branch offices. in one integrated. easy-to-manage package Includes file and print sharing. gateway and routing features, intelligent hub. messaging system and centralized system management tools Available in SNA and internetworking versions.

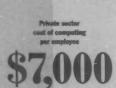


DOES NOT COMPUTE

Private sector service companies spend 14,000 times more per employee on computing than cities do

> Public sector cost of computing per employee

50¢



In Depth

TO DELIVER TECHNOLOGY, LOCAL GOVERNMENT TECH CHIEFS COMBAT FIEFDOMS, TOUGH REGULATIONS AND EMPTY COFFERS

BY ELLIS BOOKER

ice President Albert
Gore's recent report on
streamlining the federal
government might well include a page taken from its
local offspring. Towns, cities
and counties across the U.S.
have already come to see information technology as a lever for "reinventing" government, improving its services while eliminating waste and cutting bureaucracy.

Much like their private sector counterparts, information systems departments in municipal government are struggling to downsize and streamline technologies such as client/server computing and administrative arrangements such as data center outsourcing. But in their path are challenges such as fiscal crises, tough procurement regulations and constituents that give more weight to public rather than technical services.

The money shortage affecting IS shops everywhere can also be found hobbling local government IS.

"Funding is a killer," declares Vivienne Dacey, MIS division administrator for the city of Phoenix.

One of Phoenix's top IS projects — a TCP/IP metropolitan-area network that in November will link, initially, 400 of the city's 3,000 departmental PCs on an Ethernet backbone — got through because it was piggybacked on another project: the building of a new city hall.

Others aren't as lucky. "Lots of cities can't afford to get rid of decrepit systems — mostly mainframes — because it would cost too much to build or buy software for whatever new hardware they wanted to bring in," says Kenneth Kraemer, director at the Center for Research on Information Technology and Organizations at the University of California at Irvine. Kraemer recently completed a survey of IS trends in 2.500 cities and counties across the U.S.

Not only are budgets constrained — in Kraemer's sample, 60% of cities expect their IS budget to hold steady in 1994, and 22% expect a decrease — but local government IS is increasingly getting allocated a smaller percent of the total budget than is the case in the private sector. Kraemer's analysis shows that cities spend an average of 4% of their total operating budgets on IS, compared with 8% of total operating budgets spent by private sector service firms.

Beyond funding issues, government IS shops must struggle to reach their goals despite special requirements and pressures encountered only by public agencies.

While private sector companies are often made up of different departments working in harmony, municipal governments are composed of public services and infrastructures, often with conflicting needs. These institutional "fiedoms" within local governments can make enterprise IS projects a difficult proposition.

For instance, the town of Framingham, Mass., has until recently had a fractured setup, with the IS department under the control of its selectmen — a three-member board. Only those departments under the selectmen had to comply with IS-set directives. A new bylaw, however, enables IS to set directives for all departments.

More bureaucratic hurdles

Local governments are also dogged by daunting procurement regulations. Unlike the feds, many city and county governments operate under balanced budget mandates and, therefore, cannot use deficit spending to fund technology initiatives.

"The procurement procedures were implemented in the past 100 years to make sure there are no kickbacks," says Wilpen L. Gorr, professor of public policy and MIS

at the Heinz School of Public Policy and Management at Carnegie Mellon University in Pittsburgh. Today, however, "by the time you go through the steps, the technology has changed."

And then there's the transient factor of public employment. Gorr and others note that cities and counties, run by people who must stand for election every few years, tend to be reactive, funding projects



that are immediately visible to the voting public, such as extra policemen or firefighters.

"Being fiscally funded can be a difficulty," says Dacey, who adds that she needs to look "way beyond" that horizon to plan IS investments properly. Her IS department's operating budget has see-sawed, moving from \$11.4 million for the 1991/1992 fiscal year to \$10.9 million last year to \$11.5 million this year.

Dacey says the city as a whole is far behind in automation. "We have to find a way to get into the 20th century, let alone the 21st."

Some cities opt to float munici-

pal bonds to pay for long-range capital projects. In 1988, Phoenix created a \$22 million municipal fund to pay for projects in five areas: records management; office automation/information

sharing; an applications development center; a geographic information system (GIS); and a municipal court management system.

It doesn't help that the success of IS technologies in the private sector have caused the public service expectations of voters to grow. "Citizens are coming to expect 24-hour service and getting their questions answered while they are on the phone," says Tom Fletcher, associate director of the Program on Strategic Computing and Telecommunications in the Public Sector at Harvard University's Kennedy School of Government in Cambridge, Mass.

As a result, a much talked-about goal in government circles at all levels today is the creation of an "accessible, one-stop set of electronic services to take the guesswork out of dealing with government," Fletcher says.

To achieve this feat, three items are dominating the attention of local government IS departments:

*Standardization of hardware and data for use between departments and among levels of local and federal government.

City limits, page 137

CITY OF PHOENIX'S VIVIENNE DACEY: 'BEING FISCALLY FUNDED CAN BE A DIFFICULTY'

Top 10 cities by IS budget (in millions)		Number of government IS employees
Los Angeles	540	500
San Diego	\$36	220
Jacksonville, Fla.	\$30	235
Dallas	\$20	185
San Francisco	\$20	230
Cincinnati	\$18	170
Houston	\$15	194
Long Beach, Calif.	\$15	95
Seattle	\$14	100
Detroit	513	105

Source: City & State magazine

INTRODUCING PLUG & PLAY TER

... AND A NEW DEFINITION OF

The new Dorio" plug and play terminal does two things. Lowers the price and ups the ante in the terminal market.

It's 16 Terminals in One. Why choose from many terminals (with prices that range from ridiculous to absurd) when just one can fit your needs? The Dorio emulates over 16 terminals. Like the Wyse 50+, 60, 150, 160 text and PCTerm, Televideo 910+, 925, and 950 models, ADDS Viewpoint A2, and SCO Console Mode to name a few. And because Dorio is built by Digital Equipment Corporation, it also emulates the VT 320, VT220, VT100, VT52 and VT420 PCTerm terminals better than any clone on the market. All in one terminal, all for just \$399.

Knock-Out Reliability. You don't have to worry about reliability, either. Dorio is built to the same quality standards that have made Digital a leader in the terminal

Available from these distributors: Arrow Electronics, Inc., MTI Systems Division (800) 955-9632, Almac/MTI Systems (800) 426-1410, Avnet Computer (800) 426-7999, Impact Marketing (800) 345-1110, Inland Associates (800) 888-7800, Pioneer Standard Electronics (800) 332-4686 x6942, Pioneer Technologies (800) 227-1693, Wyle Laboratories (800) 332-6995.

Or call 1-800-BY-DORIO (1-800-293-6746) for the distributor nearest you.

THE DORIO MINAL FOR \$399*...

LIMITED TIME OFFER

LIMITED TIME OFFER

DORIO TERMINALS

DORIO TERMINALS

LIO QUALIFOR DETAILS TOLAN.

market for over 20 years. And with an estimated life expectancy of 10 years, you'll probably get tired of the Dorio terminal before it gets tired of you.

QUALITY AND RELIABILITY.

Money-Back Guarantee. Here's the clincher. Dorio comes with a *Hassle-Free-No-Questions-Asked-30-Day-Money-Back-Guarantee*. And Dorio supports over 30 operating systems. So whether you run UNIX,* multiuser DOS,* or PICK,* Dorio runs your applications faithfully or you can send it back. All this *and* a 3-year warranty.

Call 1-800-BY-DORIO today! Call now for more information on the Dorio terminal. With a money back guarantee, \$399 price tag, and outstanding reliability, we've redefined the plug and play terminal market.

DORIO. BRINGING VALUE TO THE PLUG AND PLAY MARKET.

© 1983. All rights reserved. Dorio and VT are trademarks of Digital Equipment Corporation. Wyse is a trademark of Wyse Technology Inc. Viewpoint is a trademark of Informix Software, Inc. SCO is a trademark of Santa Cruz Operations, Inc. Unix is a trademark of Unix Systems Laboratories. MS-DOS is a registered trademark of Microsoft Corporation. Pick is a trademark of Pick Systems. "Manufacturer's suggested list orice as of 9/23/3/30.

tates WYSE 160/60 Native

Manufactured by
Digital Equipment Corporation

Announcing COMPUTERWORLD on CD

Search Over 25,000 Articles in 30 Seconds – from Your Desktop

The editors of COMPUTERWORLD are pleased to announce the arrival of COMPUTERWORLD on CD. Now, all the valuable information that you rely on every week is available through the exciting technology of CD-ROM. Just think, four years of COMPUTERWORLD at your fingertips...no more piles of back issues in the corner, no more frantic searches through pages of newsprint... years of COMPUTERWORLD ready for searching, analyzing, cross-indexing and competitive analysis.





Here's What You Get When You Subscribe:

- · Over four years worth of full text articles from COMPUTERWORLD.
- · Selected graphics from each issue showing industry trends, product comparisons and more.
- Articles from COMPUTERWORLD's annual Premier 100 and Computer Careers magazines.
- Detailed information from Premier 100 data about IS budgets, profit growth, total scores and company highlights about all the Premier 100 companies.
- · Over five years worth of articles from the Journal of Information Systems Education, published by DPMA's Special Interest Group on Education
- · Annual subscription includes four discs updated quarterly.

COMPUTERWORLD on CD Helps You:

- · Search comprehensive product and vendor information quickly.
- · Follow critical technology trends.
- Analyze top company IS profiles.
- · Execute key word searches on any topic in seconds.
- · Eliminate mass paper storage.

Easy-To-Use

Our powerful search and retrieval capability will deliver exactly what you are looking for in a matter of seconds . . . it's simple . . . all you need to do is type in either a word or phrase related to your questions.

Plus, COMPUTERWORLD on CD features multiplatform compatibility on PC (DOS and OS/2), Windows, and Multimedia Player environments. And, coming in October 1993, COMPUTERWORLD on CD will also run in a Mac environment.

Two Ways To Become A Charter Subscriber and SAVE \$

Subscribe today and become a charter subscriber for just \$295. You save \$100 off the regular annual subscription rate of \$395.

2. Order a Sony Multimedia CD Player and Get a **FREE Charter Subscription**

Sony Corporation has just announced a special offer only for COMPUTERWORLD subscribers.

Now Sony's spectacular, new, portable, PIX-100 Multimedia CD Player is available at the specially packaged price of just \$995. This is no ordinary CD-ROM player. The Sony PIX-100 combines audio with text, graphics, and animation. It plays multimedia CD-ROM software and features CD music playback capability.

PLUS, with your Sony Multimedia CD-ROM player, you'll get a 1 year subscription to COMPUTERWORLD on CD absolutely FREE.

Don't miss this opportunity to have quick access to the

most powerful news source on information systems. Order today by completing and returning the form below. For faster service call:

(800) 285-3821. (Outside the U.S. call (508) 879-0006).

What users like about Computerworld on CD:

- "It can look up products and company names ... indispensable."
- "...finds product information and client information quickly."
- "...full base text, good graphical start for each article."
- "Can search across multiple issues and find the thing I'm looking for. Makes life
- "The sheer volume of what's in it. Easy access without having to go to a library
- "It has information not found on Computer Select."

Source: Survey of Computerworld on CD subscribers, May 1993.

COMPUTERWORLD

Yes! Please reserve my Charter Subscription to COMPUTERWORLD on CD and send me my first quarterly disk.

- ☐ Please enter my subscription to COMPUTERWORLD on CD. I'll pay just \$295*, a savings of \$100 off the regular annual rate. Send no money now. We'll bill you later.
- ☐ Please send me my Sony Multimedia CD-ROM Player. Enclosed is my check for \$995* And, with this purchase I'll also receive a FREE subscription to COMPUTERWORLD on CD.

FIRST NAME	LAST NAME		
TITLE	COMPANY		
ADDRESS			
CITY	STATE	ZIP	

To complete your order, mail this form to: Emerging Technology Applications, ATTN: Sales Department, 111 Speen Street, Framingham, MA 01701. For Credit Card orders call: (800) 285-3821. Checks should be made payable to: Emerging Technology Applications.

City limits

CONTINUED FROM PAGE 133

- Information infrastructures, especially related to networks.
- Technical/political issues (information access regulation and privacy).

Some local governments are even going beyond merely using technology to providing service and making money. Local governments typically have more latitude in generating revenue from technology than their federal counterparts due to flexible accounting rules.

Fairfax County in Virginia generated roughly \$200,000 last year from its on-line database for lawyers and real estate firms. Prince Georges County in Maryland is also generating revenue from an on-line court records system deployed three years ago with Bell Atlantic Corp.

"Local government is taking a dynamic role in managing information and providing needed services to the private sector, which is a twist," says Costas Toregus, president of Public Technology, Inc., a Washington, D.C.-based nonprofit research company for cities and counties.

Fletcher summed up the pressure on local government IS: "To say that city hall is open 9

WHAT COUNTS F	OK COUNTIES			
Program managers in 570 counties assessed the importance of 13 new information technologies				
Based on scale of 1 to 6, where is not impo				
Output devices	5.8			
GIS technology	5.2			
Voice communications	5.2			
End-user technology	5.1			
IS	5.1			
Networking options	3.1			
Data storage	5.0			
Communications	3.0			
Input	49			
Document management	4.8			
Telecommunications	44			
Decision support	4.2			
Citizen interaction	3.8			

Source: Syracuse University, School of Information Studies

to 5, Monday through Friday, is becoming less and less satisfactory to citizens."

Kim S. Nash, Thomas Hoffman and Stephen P. Klett Jr. contributed to this report.

Private sector 'graduates'

As government IS plays catch-up with the commercial sector, it is increasingly tapping from that well of know-how, expertise and can-do attitude found in the private sector.

For instance, the Top 2 IS officers for the city of Phoenix came from large nongovernmental companies. Vivienne Dacey, MIS division administrator, and IS director Laraine Rodgers both came to Phoenix from AT&T.

Dacey, who has an IS budget of approximately \$11 million this year, says that in her own IS hiring she looks for wide, private sector experience. Private sector employees, she says, are more goal-oriented and not as mired in bureaucratic thinking.

However, not everyone agrees that staffing government IS shops with employees weaned in business is a great idea.

"[These employees] have to

have some appreciation for the legitimate political restraints," such as privacy issues and accountability to constituents, says Tom Fletcher at Harvard's Kennedy School of Government.

Still, the problem of IS staffing in local government is pandemic. In general, government is a revolving door for technical people, according to Professor Wilpen L. Gorr at Carnegie Mellon University.

"A lot of people who want to get technical training will start with a government agency and then move on to a private firm where the pay is better," Gorr says.

Facing this reality, some IS executives in local government are hiring the only employees they can afford. Most of the 81 employees at Fairfax County's Cooperative Computer Center in Virginia, for instance, were hired right out of high school and trained in-house.

-Ellis Booker

HEALTHY: DADE COUNTY

Invigorated by GIS, fiber-optic projects

Don't expect to find miles of red tape strangling Dade County, Fla., or its IS operations. Once Joacquin Avino became the Dade County manager in June 1988, he encouraged the municipality's supporting agencies to run their groups like private businesses.

Since then, Dade County's IS division has entered into a handful of cooperative alliances with private sector firms, including a shared GIS project with Florida Power & Light Co. and a fiber-optic highway barter agreement with Intermedia Communications of Florida, Inc.

In 1987, Dade County laid 20 miles of fiber-optic wire to connect its primary data center with the downtown

government center and the justice center. Then, in 1990, Intermedia approached Dade County about obtaining a right of way to lay its fiber-optic lines through county conduits.

Realizing that a barter agreement would benefit both, the two groups later that year signed a contract that netted Dade County \$200,000 a year

in revenue and 25 free miles of fiberoptic connections, says Manuel Garcia, director of Dade County's information technology department. The deal saved Dade County \$1.5 million because Intermedia laid down the additional fiber.

Using the fiber-optic backbone, Dade County expects to connect 20,000 of its switches and computer terminals by the end of 1997, Garcia says. At present, the county has linked 4,000 terminals and PCs through the initial fiber project, which has saved the municipality an extra \$300,000 annually in data circuit costs once paid to the phone company.

Dade County has also profited from a GIS development contract it entered into with Florida Power in May 1992.

A few years earlier, Dade County had developed a network-based

street GIS used by the police and other departments. However, Garcia says, the GIS wasn't accurate enough.

Enter Florida Power, which had been running its own pilot GIS to route its service technicians. By sharing costs to create the GIS files with Florida Power, the county saved \$1.5 million in development and ex-

pects to save \$120,000 annually in maintenance. The files are expected to be developed by year's end.

- Thomas Hoffman

AILING: CITY OF ANAHEIM

Squeezing life out of wheezing systems



City of Anaheim's Dan Amyx: 'We just don't have the cash to play with'

Bruised by economic recession, information systems at the city of Anaheim, Calif., have come to a standstill. It all comes down to money.

More than 16%—or \$1 million—has been carved out of Anaheim's original \$6 million IS budget for fiscal 1993. The city's IS staff of 38 is about half the 70-odd data processing personnel that worked for the city two

"Until a few years ago, we always planned long-term projects. Now our biggest new project is surviving." says Dan Amyx, manager of data processing. Anaheim can't afford new technologies, even if it would save money in the long run.

"We just don't have the cash to play with." he says.

Like most local governments, Anaheim's IS group charges back to user departments based on processor use, space and equipment maintenance levels. Right now, only one user—the public utilities group—is embarking on new projects and accounts for more than half of the IS department's business. The group plans to install an IBM AS/400 for customer billing.

"That'll be a 12- to 18-month project," Amyx says, "if the city council approves it."

Anabeim's budget depends on tax dollars brought in by well-attended attractions such as Disneyland and the California Angels' Anaheim Stadium. "When people aren't coming to conventions or taking in ballgames, that's a drop in dollars for us," he explains.

The city has thus far kept IS inhouse, refusing to go the outsourcing route that Orange County (where Anaheim is located) chose 15 years ago. It fears losing control and ultimately paying more for external services than it would cost to keep IS internal.

Anaheim is, however, considering farming out specific tasks. One target is its 15-year-old billing system, which can't accommodate the U.S. Post Office's Zip+4 system. A request for the proposal is slated to go out this month.

"We hate to give up control, but there are some things other people can do more cheaply than we can," Amyx acknowledges.

-Kim S. Nash

it's all time high, wiping out more the 'Steep Learning Curve'

Those pressures leave little time for a new boss to master IBM's business. Fully 51% of IBM customers surveyed by Computerworld magazine say IBM needs to hire a CEO with a technology background. With Mr. Gerstner lacking such a reddersor. Polic senior to be on a way: were pedigree, "he's going to be on a very, very steep learning curve," says David Hanna, a former IBM executive who is now presi-dent of Hanna Group, a computer-consult-

THE WALL STREET JOURNAL March 25th, 1993

Computers & Automation

Investor's Business Daily

March 25th, 1993

EEK. THERE'S A MOUSE in the co-EER, THERE'S A MOUSE in the corner office. The percentage of concutives who regularly use computers nearly doubled in four years, to 81% from 42% in 1980, says a study by Computerworld magazine and An-dersen Consulting. Fewer than half think they are getting their money's worth from

> THE WALL STREET JOURNAL April 20th, 1993

eir question: Where are the productivity savings?

The New York Eimes April 25th, 1993

ORPORATE executives app to be more knowledgeable about computer technolgy than ever before, but they have also become more demanding and less orgiving, a new survey has found. While they believe information tech-nologies are the key to competitive advantage, they also say that they have not been getting their money's worth.
The survey, conducted by the com-

puter industry newspaper, Computer-world and Andersen Consulting, also found that 81 percent of top executives are personally using computers in their daily jobs, nearly double the percentage reported when the survey was first taken four years ago.

More than 200 chief executives chief operating officers, and chief fi nancial officers, representing a broad range of businesses, participated in the study, the results of which were published in Computerworld last week. Annual company sales ranged from \$250 million to \$20 billion

ALC CUSTOMERS HAVE THEIR SAY TOO

IBM directors should forge about hiring another salesguy to replace John Akers as CEO. And whoever he is, Aker's successor should fire a whole successor should fire a whole lot more people. So says a Computerworld survey of executives at 100 companies that spend at least half their computer budgets on IBM products. The participants, who work at the likes of Kmart and Parker Hanniffa, a maker of neumatic and budraulic compneumatic and hydraulic com-ponents, also said IBM's reor-

pneumatic and hydraulic components, also said IBM's reorganization into smaller business units should go further.

Computerworld, in addition, interviewed various computer industry luminaries, including Steve Jobs. The Next CEO marveled that none of IBM's machines from mainframes to PC's uses the same software. Says Jobs: "IBM's troubles stem from the fact that they appeach everything from a hard-order that they appeach everything from a hard-order. roach everything from a hard-ware strategy, and the Nineties is a software decade.

Not everybody agreed that breaking up is the way for IBM to go. Said Larry Ellison, CEO and co-founder of **Oracle**, a software company: "This is the

anu no ...her, Ric

a retured 1.B.M. vice president.

A survey of some 100 of 1.B.M.'s largest customers by Computerword magazine found that 51 percent preferred someone with a technical background to be the computer giant's new chief executive, while 36 percent said technical expertise was not essential and 13 percent had no opinion.

But some industry experts say

193 FORTUNE II

FORTUNE April 5th, 1993

Get the news of IS before it's the news of business.

The New York Times March 25th, 1993

Why not do what the nation's leading business publications do when they want the latest news in IS. Go to the source — COMPUTERWORLD.

Week in and week out, 58 reporters, writers, and designers work around the clock to bring you the latest breaking news from all over the world.

No other newspaper covers the who, what, when, why, and how of IS in greater depth than COMPUTER-WORLD. You'll find stories on everything from rightsizing to reengineering, communications to client/server computing, network management to new technology.

It's no wonder our professional peers named COMPUTERWORLD the "Best Computer Newspaper" at the Eighth Annual Computer Press Awards. And it's no wonder over 139,000 IS professionals pay to subscribe to COMPUTERWORLD every week. Shouldn't you?

Order COMPUTERWORLD and you'll receive 51 information-packed issues. Plus, you'll get our special bonus publication, The Premier 100, an annual profile of the leading companies using information systems technology.

Call us toll-free at 1-800-343-6474. Or use the postage-paid subscription card bound into this issue to order your own copy of COMPUTERWORLD.

Then you'll have all the news you need to get ahead in IS — even before it appears in the nation's top business publications.



The Newspaper of IS

Would we be running this ad if we came in second?

You probably won't see too many other ads singing the praises of this study.

And that's too bad.

"CompPro" as Simmons calls it, is the largest *independent* study of computer professionals ever produced by a major media research firm.

So it's not some publication blowing smoke about how they won their own research study.

It's Simmons.

And Simmons says nobody delivers computer professionals every week like Computerworld.



In fact, a quick check of the numbers shows that we deliver the most efficient reach of this all-important target. If you'd like to know what that means to you, call your Computerworld rep for a complete reach and frequency analysis.

You see, we're not only number one with computer professionals. We're also number one with the people who need to reach them.

COMPUTERWORLD

The Newspaper of IS.

C1993 CW Publishing, Inc., Computerworld, 375 Cochituate Rd., Frammeham, MA 01701-9171. An IIX/ Company. All brand or product names are trademarks or recovered trademarks of their respective holders.

Computer Careers

UNIX VARIAN How different are they



By Joe Panepinto

IN THE 1970s AND 1980s, the proliferation of Unix flavors led to innovation In the

1990s, the resulting Unix smorgasbord can lead to indigestion.

At last count, more than 40 Unix variants were commercially available. A debate about which Unix is best could rapidly escalate into a technical feature-byfeature snooze-fest at best, a grand-scale holy war at worst.

For those seeking an information systems career in Unix systems administration, programming or development, there are a few overriding concerns among them, how steep is the learning curve from one Unix variant to another and what are some of the differences between variants.

The learning curve

From a careers and skills perspective, the basic differences among the Unix variants emanate from differences in the operating system kernels on which they are based: Berkeley Software Distribution (BSD) or Unix System V from Unix System Laboratories, Inc. In addition. there are hybrid Unix variants that stray far from either BSD or System V such as IBM's AIX, the Open Software Founda-

tion's OSF/1, Apple Computer, Inc.'s A/UX and Next, Inc.'s NextStep. Those versions of Unix incorporate some elements of object-oriented technology and have steeper learning curves, especially for systems administration.

In general, however, skills in Unix are easily transferable and are becoming even more so. In addition, many of the best features of BSD and Unix System V have been brought together in Unix SysCalif., says he sees the differences among Unix variants as interpretations of a single language and not as wholly different languages.

"A knowledgeable person could speak in New England or Texas and still be understood, though there could be some very frustrating differences in the accents," Reiken says.

For Unix programmers and developers, the development language is always the same: ANSI C; the standard application programming interfaces are the same: Posix, X Portability Guide, System V Interface Definition; and the shell languages are the same: sh, csh, ksh. Even so, programming differences do exist.

For example, if a programmer wishes

er," says Ray Swartz, president of Berkeley Decision Systems, makers of Training on Video products for learning Unix.

Even for those who have been weaned on BSD Unix, the transition is not difficult. In the example above, the programmer does not need to memorize the BSD equivalents of System V Release 4 commands because System V Release 4 provides a ucblib directory that contains an archive library with equivalent BSD commands. The programmer only needs to name the library on the compile line, and all the recognized BSD commands will be converted to System V Release 4.

Unix systems administrators face similar niggling differences. For example, the control files are different. In BSD, the rc (run command) shell script is a single ASCII file that calls to other files for startup and customization (for example, TCP/IP); in SVR4 there are different .rc directories at each run level.

"The differences are there, but an experienced Unix system administrator would be able to navigate either system with the basic Unix knowledge that .rc stands for run command," Reiken says. To find all control files, a system administrator on either BSD or System V Release 4 Unix could use the command ls\etc*re*.

'Everyone who doesn't like Unix makes a big deal about the differences,' says Paul Cubbage, principal analyst of software tools at Dataquest, Inc. "But once you learn Unix, dealing with the variants is not a big deal."

Panepinto is a free-lance writer in Amherst.

Analysts agree that market con

1. Sun's Solaris 1.0

4. Silicon Graphics' Irix

5. Integraph's Clix

2. HP's HP/LIX

3. IBM's AIX

- 2 Hewlett-Packard's HP/IIX
- 3. NCR/AT&T's System V Release 4
- 4. Sun's Solaris 1.0
- 5. Siemens/Nixdorf Information Systems' Sinix

Source: International Data Corp., Framingham, Mass

tem V Release 4.

Learning one Unix variant means you're 90% or 80% of the way to learning any of the others," says Norton Greenfield, director of Unix systems at Computer Intelligence/InfoCorp in Santa Clara, Calif. Bill Reiken, principal consultant at .SH Consulting in Santa Clara,

to zero out a block of storage in System V Release 4, the command is memset; BSD systems use the command bzero.

'If people want to make sure their knowledge doesn't become obsolete, they should train on [System V Release 4l because it is where there has been a large effort to bring all this stuff togeth-

ASSISTANT DATA CENTER DIRECTOR FOR FLORIDA DEPARTMENT OF LABOR AND EMPLOYMENT SECURITY POSITION NUMBER: 05744 SALARY RANGE: S35K - S59K

The Florida Department of Labor and Employment Security is search for an individual to lead our Systems Design and Programming group or sisting of 80 professionals. This position will report to the Informational Management Cereller Directors.

Management Center Director.

The department has adopted a cooperative processing strategy utilizing multiple platforms of technology. Through re-engineering efforts, information technology and delivery services will migraft to towards a client/server environment. The successful candidate will have a proven track record for managing and ferecting client/server development, CASE tools, ISDM, and relational data base. The individual must possess strong management and interpersonal skills.

Minimum qualifications for this position is a bachelor's degree from a credited college or university and a minimum of five years expense data processing, two years of which must have been in a manage

Florida Department of Labor and Employment Security Information Management Center © 2571 Executive Center Circle 201 Howard Building © Tallahassee, Florida 32399-0692 ATTN: Debora Templar © (904) 488-4230 Ext. 106

ATTH: Debora Timplar e (904) 488-4230 Ext. 106

PLEASE NOTE:

*Previous applicants need not apply, you will be considered for the position:

*Position is located in Tallahassee, Florida

*Milerofiles are encouraged to apply.

An Equal Opportunity Employer/Altimative Action Employer

Position is located in Tallahassee, Florida

An Equal Opportunity Employer/Altimative Action Employer

provided by Chapter 265 Lawr of Eborda. We here only U.S. Citizens and

savely authorized Alen workers.

NDEPT is important to you For 10 years we've been a recognized leader for providing challenging, long-term and confinuous assignments. We've grown 20% per year, which nears we offer you 20% more work, year after year. **CONSULTANTS** o SYBASE o AS/400 o NATURAL MMEDIATE ORACLE Long-term Contracts TANDEM TELON UNIX, C++ in New England MS-WINDOWS - CICS SALES REPS for our BOSTON WANTED and ATLANTA offices Send or FAX resume to: Kelly Ann 888 Worcester Rd · Wellesley, MA 02161 (800) 66-ADEPT - FAX (617) 237-0892 The Absolute Alternative In nformation Technology Consulting

PRO-STAR -· CLIENT SERVER

We're one of the West's premier System Integration & Consulting Service firms, spread throughout a 7-State, 9-City region. Our SALT LAKE office seeks pros with:

SQL/QUI skillsets, inct: ORACLE, SYBASE, INFORMIX, and POWERBUILDER, VISUALBASIC, GUPTA, EASEL, MOTIF. A\$400: SYNON and/or RPG III

We're staffing long term projects with aggressive Fortune 500 firms. We provide salaried employment with excellent benefits, and training opportunities in many state-of-the-art tools (such as Powerbuilder 3.0). Please respond to:

PRO-STAR

5282 S. 320 W. #D-292, Salt Lake, Utah 84107 801-266-6138 • FAX 801-266-0069

Nationwide Openings

• 2+ Years Experience

Salaried or Project Basis

Send/Fax resume to: alysts International Corp. P.O. Box 39612 Minneapolis, MN 55439 Fax (612) 897-4544

GET OUT * OF TOWN NATIONWIDE OPPORTUNITIES

YOUR HOME TOWN MAY HAVE MANY JOHN, BUT NOT YOUR AGREEN REPURITURITY. THE COMMATIONAL COMPUTER SEARCH AGENCIES REPULALIZES IN THE PLACEMENT AND PAID RELOCATION OF COMPUTER SEARCH TO A LIFE OF THE PLACEMENT AND PAID RELOCATION OF THE PLACEMENT AND PAID RELOCATION OF THE PLACEMENT AND PAID RELOCATION OF THE PLACE OF

COMPUTER TECH NETWORK

- AS400

MAINFRAME: DB2/CICS
Natural 2 • Internets • CSP
Bachman • DASD • Fed/Chips
CASE • VAX/RD8 • Telon
CICS/Brokerage • Fortran
IDMS/SAS • Ormifust • Focus
UNISYS 2200 Trans Proc • APS

CLIENT ZETVER: Informix
Peoplesoft • Powerbuilder
Sybase/DBA • Sybase Devl
C++ • Foxpro • Autocad
Smalltaikflo • Sys/Admins
Windows • Ethernet • Oracle 7.0
Visual BASIC • DataBase
Cinco • Visual C/C++ • Mamps

Rolen Rogers Consulting 1212 6 TH Avo, 9th FL, MYC 10036

CONSULTANTS

830 338 5995 212-921-1319 fex 212-302-4363

CONSULTANTS **TANDEM** All Technologies

National Contracting Consulting Opportunities for Tandem Professionals

800-959-3088

LAN training

1992, the average price for either operational or administrative training for LANs was \$750 per day for an average of four days, or \$3,000 per LAN. By 1995, this is expected to drop only \$100, to \$2,900 per LAN. Training time is expected to remain constant.

Market Intelligence Research Corp., Mountain View, Calif

Call screening and dispatch: Takes calls and routes to the correct support area.

First level support: Answers phones and solves 50% or more of the problems handled.

Second level support: Can solve the majority of problems. Some phone duty.

Supervisor: Responsible for a shift or functional group within the help desk.

Manager: Responsible for the entire help desk function.

BASE: 1,694 RESPONDENTS

\$24,000

\$28,287

\$33,736

\$39,419

\$49,880

SALARY BOOSTERS

- Help desk experience
 - LAN support experience
- **■** Continued education
 - PC support skills
 - Data processing experience

BASE: 1.792 RESPONDENTS



Certifiably client/server

Sybase, Inc. is collaborating with Minneapolis-based Drake Training and Technologies to create an independent certification program for the client/server software industry. The certification program will test both Sybase specific and general client/server expertise. The first series of tests will be available by late 1993.

LIGHTS, CAMERA, ACTION!



Hewlett-Packard Co. in Cupertino, Calif., and Littleton, Colo.-based Virginia A. Ostendorf,

Inc. are presenting a satellitedelivered workshop called "Training by Live Television."

The program was designed for trainers and managers who wish to learn more about teaching remote learners via live television. It will air Oct. 5 at 12:30 p.m. Eastern time and will be broadcast to both HP sites and others licensed to host the event. For more information, contact Virginia A. Ostendorf, Inc. at (303) 797-3524.

Now you see it, now you don't

Sharon Welch, manager of Global Compute Services at Xerox Corp., asked her team to design an organization that would show how they would be operating in 10 rs. "If your vision doesn't make me gasp, it's not lutionary enough," she said. Given the current trend toward fewer managers and the growth of crossfunctional teams, they predicted their organization would no longer exist!

CONSULTANTS

for Sacramento and San Francisco Bay area.

Full time employment with excellent benefits

Mail or fax resumes to:

Edge Consulting Group, Inc. 1827 Powers Ferry Rd. Building 3, Suite 300 Marietta, GA 30067 404-952-4881 Fax 916-983-8676

Nationwide Opportunities

MINDBANK

8500 Leesburg Pike, Ste 7800 Vienno, VA 22182 Call Margaret Manley or Carole Shafer: 1-800-444-2234 Fax: 703-761-3038

IEF is a registered trades

CONSULTANTS MIMI

Immediate need NOW for JES2 or 3 Very long contracts or F/T

Many other consulting & F/T opportunities available MIMI SIMON ASSOC 99 West St., Switz 1105, NYC 10000 (212) 406-1705 FAX: 406-1768



CA & AZ Contracts

P. Murphy & Assoc. 4405 Riverside Dr. #100, Burbank, CA 91505 (818) 841-2002 FAX (818) 841-2122 Member NACCB



* PEOPLESOFT * MARCAM * IDE * MAPICS * DBS *ASK * BPCS * CA * ISI ★ CYBORG ★ SW/2000 ★ SAP Send or Fax your Resume: EXCEL PARTNERS INC. 461 Cheetnut Ridge Rd. Suite 308 Woodstill Lake, H.J. 07675 FAX (201) 391-6740

advancing careers like yours We specialize in listing of current fee-paid

X WINDOWS DEVELOPER HEAVY DSGN/CODE But UNIX SUN SYBASE C IOMS OBA DATA BASE ARCHITECT \$80K Distributed DB arch. design INFORMIX DEA ONLINE ENGINE ESOLC TO SOOK

MGR. E-MAIL INFRASTRUCTURE \$70K SW DESIGNER/PGMR-MGR VAX/VMS STORAGE MGMT. SYS PROG \$60K Must have SMS HSM DASD CICS

OOP/OOD/OOA, C++, SMALLTALK.

CICS/DB2 PROG./ANALYSTS \$55K AIX/UNIX/OS2 SYS/PROG. \$55K BANKING PROGRAMMERS \$55K DDA. Systematics. AFS. etc. MGR. MARKETING ANALYSIS \$50K BAS PROG./ANALYST SSOR POWERBURDER ANALYST \$50K

opportunities. Contact our nearest member firm & gain access to ALL our choice openings in your field.

ADS/O SR. P/A To \$50K INSURANCE ANALYST \$47K BPCS-AS/SET SR. PROG/ANALYST SR. P/A 3+ YRS. RPG/400 MFG. & AS/400 S0FTWARE 2000 UNIX C C++ PROG/ANALYST

SOFTWARE PACKAGES (M&D. MSA. Software 2000 etc.) SOPEN ORACLE/SQLFORMS P/A SOPEN
on UNIX or VMS platforms SAS BATCH OR AF PROG/AMALYST

Call or FAX your resume to our local office nearest you, & put our entire network to work for you.

ATLANTA: Abecus Networks, Inc. (404) 446-1116 • FAX (404) 729-9803 BOSTON: The Kleven Group, Inc. (617) 861-1020 • FAX (617) 861-1047 CHICAGO Coreer Consultants, Inc. (708) 563-9780 • FAX (708) 563-9784 CINCINNATI: Task Group (513) 821-8275 • FAX (513) 821-8311 CLEVELAND Innovative Resources C (216) 331-1757 • FAX (216) 331-3499 COLLIMBILIS: Michael Thomas, Inc. (614) 846-0926 • FAX (614) 847-5633 DALLAS: DataPro Personnel Consu (214) 661-8600 • FAX (214) 861-130 DERVER Abscus Consultants, Inc. (303) 759-5064 * FAX (303) 759-9846 DETROIT AJM Professional Services (313) 827-7660 • FAX (313) 827-7665

GREENSBORO: DataMasters (Dept. CWN) (919) 373-1461 • FAX (919) 373-1501 (919) 373-1901 - FAN (319) 410-1901 (173) 628-4100 - FAX (713) 628-4106 JERSEY CITY, NJ: Systems Search M.I.S. (201) 761-4400 - FAX (201) 761-0128 (201) 761-4980 PAA (201) 761-0120 KAMSAS CITY: DP Career Association (913) 236-8288 FAX (913) 238-9748 MEMPHS: Information Systems (Jros. (901) 684-1030 FAX (801) 684-1068 MB. WALKEE: BDP Consultants. Inc. (414) 255-8083 FAX (414) 255-5459 MINNEAPOLIS/ST. PAUL: ESP, Inc. (612) 337-3000 • FAX (612) 337-9191 NEW YORK: Botal Associator, Inc. (212) 227-7370 • FAX (212) 964-5033

PHILADELPHIA: Systems Personnel, Inc. (215) 565-8880 • FAX (215) 565-1482 OENIX Professional Career Commits) 278-5666 + FAX (502) 843-8488 BAN DIE G.O: Vectorical Directions Inc. (800) 367-1017 • FAX (619) 297-8951 BAN FRANCISCO Professione's For Ca (415) 957-1400 • FAX (415) 957-0106 SEATTLE: Houser, Martin, Morris & A (205) 453-2700 • FAX (206) 453-6725 ST. LOUIS Executive Career Consult (314) 994-3737 • FAX (314) 994-3742

Ask for your FREE copy of our 1993 Salary Survey



Midwest

DEC SYSTEM/

COMMUNICATIONS

SPECIALIST

Mead Publishing Paper Division has an immediate opening for a DEC System/ Communications Specialist at its Escanaba, Michigan mill. Qualifications include a four-year degree in a

computer curriculum, preferably computer science, plus 5-10 years' software and hard-

science, pius 5-10 years' software and hard-ware systems support experience in a DEC VAX cluster environment. Applicants must also have 3-6 years' experience with network hardware and software, including Decnet, TCP/IP, X.25, and DEC/IBM interfaces.

Mead's Escanaba mill boasts state-of-themeans Escanaba mill boasts state-of-me-art computers and control processes. It is located in Michigan's beautiful Upper Penin-sula, on the north shore of Lake Michigan, about two hours from Green Bay, Wisconsin. The area is noted for its good schools and many sports and cultural opportunities.

Resumes will be accepted through Wednesday, October 6, 1993, by Human Resources Services Supervisor, Mary Curtin, MEAD PUBLISHING PAPER DIVISION, P.O. Box 757, Escanaba, MI 48829-4757.

Mead is an Equal Opportunity Employer

We Know No Boundaries. **Neither Should You.**

At AIC, we know no boundaries. And neither do our employees. Which is why we have grown to become one of the nation's leading providers of software services. Last year, we topped the \$159 million mark in sales. To help us continue to grow, we're looking to add to our highly capable staff. So, if you want a position where you can advance your technical skills through training and hands-on learning in a broad range of industries, set your sights high. Set them on AIC.

PROGRAMMER ANALYSTS

Excellent opportunities available now for professionals with experi in any of the follow

> COBOL, CICS, DB2, ORACLE SYBASE, INFORMIX, INGRES, C. UND APS, GUI, POWERBUILDER, VISUALBASIC

Qualified candidates should have three or more years experience with analysis, design, coding and implementation of application soft-

For a rewarding career with a company that offers a constantly stimulating environment as well as a full range of benefits, including paid overtime, please send your resume, in confidence, to the AiC Technical Recruiter at the location you are interested in:

Chicago

1001 Perimeter Drive
Suite 200

Subumburg, II. 60173

(Chocago 44 Montgomery Road 5340 Shadeland Slation Sute 200

Chaumburg, II. 60173

(Chocago 47 Suite 200

Cincinnat, II. 48 Suite 200

Suite 200

Suite 200

Suite 200

Suite 201

(513) 792-2730 (317)

Columbus

471 East Broad Street
Suite 2001
Columbus, OH 43215
(614) 224-6790 (313)353-7230

(317)

Detroit
3000 Towne Center
Suite 570
Southfield, MI 48075
(313)353-7230

AiC is an Equal Opportunity Employer



COURSE DEVELOPER/ INSTRUCTOR

M.I.S. International has an exemplary twenty-two (22) year history of providing consulting services to Fortune 500 firms including the major automobile manufacturers and suppliers.

Due to the exceptional growth of our Client Server training program, this is the perfect time to step up to a position on our staff. We are seeking individuals with experience in:

- · Developing customized course content for
- Client Server classes

 Client Server Instructor classroom environment

We offer an excellent salary and flexible benefits package. Relocation assistance is also available.

For further information call 1-800-860-3377, or For intries immatter to: M.I.S. international, inc., Corporate Headquarters, 445 Enterprise Court, Bloomfield Hills, MI 48020; FAX: (313) 253-9506. Equal Opportunity Employer. SOFTWARE DESIGN ENGINEER: Design and Development of Software for NEAK-STE ATM Service Node Model-10, Broadband Communications System. Service Node Model-10, Broadband Communications System ware to support Asynchronous Transfer Mode (ATM), Switched Multi-megabit Data Services (SMDS), and Frame Relay (FR). Design and mplementation of a using optimal routing algorithms using OSI protocols CMIS/CMIP. FTAM and SNMP Familiarity with Prouting and TCP/IP. Design and development of Software services of the Communication of the Communicat and cosses in Manufacturia CHT is a selection of the Forum and the Forum

INFORMATION SYSTEMS

S38,105.60 annually, B.S. in CIS or Computer Science and 4 yrs. exp., 1 yr in a supervisory capacity. Gov't exp. preferred. Apply at City of Springfield, Personnel Department, 840 Boonville, Room 324, Springfield, Versionel City of Springfield, Personnel City of Springfield, Per

ADMINISTRATOR

upon : M/F/V/D.

SOFTWARE ENGINEER varieties on which is part of a learn of design, develop, implement and solon of the control SOFTWARE ENGINEER wanted to work as part of a team to de-

llead

SYSTEMS MANAGER: To overlook paging systems and computer network installation and
puter network installation and
hardware and software products
for company use. To oversee installation, operation and expanson of Novel Network System
for company's accounting, data
for company is accounting, data
for company is accounting,
gramming. To supervise propagation studies to insure accuracy of transmission calculations
for new lower sites. To design
for any lower sites. To design
for any

SYSTEMS MANAGER: To over-

Publishing Paper Division PROGRAMMER ANALYST wanted Duries: Designing & analyzing computerized mig. systems like querements Planning (MRP). Bia systems like querements Planning (MRP). Bia systems like grammer and programming, supervising network operations & maintenance including the programming supervising network operations & maintenance including Novell Network; computer long Novell Network; computer system for AutoCad computer systems for computer systems for computer systems Analyst. Convention of the computer systems of computer sized design. Network, database programming using C language, degramming using C language,

IS **Directors**

If you need good people, we've got them. Computerworld reaches more than 629,000 computer professionals every week. That's more qualified computer pros than any newspaper can deliver. And you can se-lect either a regional edi-tion or national edition of Computerworld's Com-puter Careers section for your advertisement.

For more recruitment information, or to place your ad regionally or nationally, call Lisa
McGrath at 800-3436474 (in MA, 508-879-

Computerworld

Weekly Regional National. And it works.

Weary of downsizing?

We are a \$25 million, metro NY-based manufacturer experiencing 35%+ growth and looking for a DP manager. You will report directly to the President and be a key member of the Executive Committee in developing IS solutions to accompate and accelerate the company's growth. Your first tasks will be to complete the implementation of MAC-PAC and plan and implement and integrated field sales automation include imgration of IAS/400 to chein-server, integration include imgration of AS/400 applications with call processing, and document imagina applications.

Want to work in a dynamic growth, entrepreneurial environment?

In this environment, you will be expected to be thoroughly familiar with AS/AO) and IAN-based database architectures and voice(3do integration, to know PCs, MAC-PAC and RPS cold, and to have the requisite interpresson I skills to work with other people from the shop floor to the executive level. You will need to have the desire to work in a dynamic environment and to broaden your skill set to develop insightful business acumen to complement your technical skills. You will be expected to aggressively seek out developing technologies and assess how they can be turned to cost-effective competitive leverage for the company's sales and profit growth.

Generous compensation and performance-based incentives will be yours if you win this job. An equal-opportunity employer, Reply in confidence with resume and solary history to Human Resources Manager, Sandberg & Sikorski/A. Jaffe, 11 His floor, 37 W. 26th Street, New York, NY 1001-1006 or FAX to 212-779-1998. No voice calls, please.

THE THE PARTY OF T

ANOTHER **REASON WHY** COMPUTERWORLD RECRUITMENT **ADVERTISING** WORKS ...

A late advertising close means you get quick response. Computerworld needs just 2 working days notice for your ad to appear in the next weekly issue!

In fact, when we receive your materials or faxed copy for your ad by 3 p.m. the Thursday before the Monday issue date, your ad will appear that Monday!* (Space reservations closing date is the same time the previous day).

Mon	Tue	Wed	Thu	Fri
			Space & Materials Close 1	2
Issue Date				

* Holiday closings may vary. Please call for details.

To place your ad regionally or nationally, call John Corrigan, Vice President/ Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

COMPUTERWORLD

Where the qualified candidates look. Every week

How to find the Midwest's top computer talent.



Now Regional! 1-800-343-6474

Midwest

• COMPUTER • CONSULTANTS

IBS, a leader in the data processing consulting industry, has been rarried as one of America's lesti-rarled as one of America's lesti-rarled as one of America's lesti-rarled as one of America's lesting in the continue our success, we re seeking professionals to work in Wiscontrol of the Continue our success, we re seeking professionals to work in Wiscontrol of the Continue out successive the continue of the con

- DOWNEDGE IN ANY Of the folio SPEEDWARE, POWERHOUSE FOCUS PROGRESS IDMS/ADSO NATURAL/ADABAS DB2, CICS AS/400, COBOL, BPCS, SYNON HONEYWELLBULL MICROFOCUS COBOL

- MICROPOURD
 PL/1
 POWERBUILDER
 C, C++
 MS WINDOWS
 NOVELL NETWARE
 SYBASE
 AMERICAN SOFTWARE



205 Bishops Way, Suite 212-CW Brookfield, WI 53005 FAX: (414) 786-7925

Publication Programmer/Analysis, design and develop Superbase disabase to be used to create programs to be used to create programs to be used to create programs to be used to publisher of mutual funds. Francial analysis mutual funds in the programs to be used by publisher of mutual funds. Francial analysis mutual funds in the published data including C programming of published data including C programming of published data funding C programming to obtain raw funds and the programming to obtain raw funds and the programming to obtain raw funds data funds and the programming to obtain raw funds data data from database to ruse and call data from database to ruse and call data from database to ruse and call data from database to ruse and data simultaneously. Floquies and data simultaneously. Floquies and data simultaneously. Floquies and complete simultaneously. Floquies and data simultaneously. Floquies and data simultaneously. Floquies and complete simultaneously. Floquies and complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to reduce complete on the plot to be performed to the plot to be performed to the plot t

Computerworld recruitment advertising works!

computer professionals read more recruitment ads in *Computerworld* than in any other newspaper.

For more information or to place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly. Regional. National. And it works.

An IDG Communications Publication

Network Consultant

The position of Network Consultant with Hewlett-Packard demands a thorough knowledge of our internationally known product line, excellent sales support and communication skills, and an in-depth understanding of UNIX*and the networking industry. It is not an easy job, but it makes for a challenging and rewarding career.

Positions are available in Dallas and Minneapolis. You will support both internal and external customers through the analysis of complex systems and network requirements, including design and configuration, optimization and performance, and implementation assistance.

To qualify, you'll need a BSCS, BSEE or equivalent and a minimum of 5 years' industry experience, including hands-on experience with: SNA, X.25, Routers, TCP/IP, SNMP, LAN Technologies, C and shell programming. Solid knowledge of current and emerging open system standards and experience with multivendor networking is highly desirable.

Hewlett-Packard is a Fortune 50 company and offers an excellent salary and benefits package, which includes profit sharing, stock purchase, 401(k), and retirement plan. Please send resume, including salary history, to: Hewlett-Packard Company, Attn: Dept. CW 927, P. O. Box 152030, Irving, TX 75015. Hewlett-Packard Company is an equal opportunity/affirmative action employer.

*UNIX is a registered trademark of UNIX Systems Laboratories.



Programmer/ Analyst

Essex Group, Inc., a leading man-ufacturer of wire and cable prod-ucts, has an immediate opportu-nity in its MIS Department in Fort Wayne, Indiana.

Wäyne, Indiana.

4 years experience developing onine/realtime manufacturing systems in a MVS/IESA environment.

Proficiency CDBUL, CICS,

VSAM, JCL, and database manVSAM, JCL, and database manVSAM, JCL, and database manufacturing systems.

Paravalet, Syncsort, DLY-269.

SOL, data upload-download techniques APPC, barcoding, EDI

TSO, good PC skills, and EDI

TSO, good PC skills, and EDI

TSO, good PC skills, and EDI

TSO, good PS skills, and EDI

Essex provides excellent compensation and benefits packages. For confidential consideration, please, send resume and salary history, by October 11, 1993 to: Essex Group, Inc., Manager Employment, P.O. Box 1601, FAX. 219-461-4199. An equal opportunity employer.

SS ESSEX

Southeast

- . IMS or CICS or DB-2
- * APS or CSP * UNISYS MAPPER * TESSERACT

- VISUAL BASIC
 IMS System Programmer

Computer Consulting

4109 Wake Forest Rd. Suite 307 Rateigh, NC 27609 1-800-222-1273 FAX (803) 738-9123

DISCOVER A NEW

Detroit Medical Center

SYSTEM FOR SUCCESS

Information Systems Division

Open House

October 4th & 5th, 4 pm - 7 pm 901 Wilshire Drive, Suite 250 Troy, MI (next to TGI Friday's)

If you're a talented healthcare IS professional looking for a greater opportunity, you can find it at the Detroit Medical Center! We will be holding an Information Systems Open House where you can meet with hiring managers to learn more about the exciting opportunities available with the DMC. Refreshments and facility tours will be provided.

The DMC is a growing, progressive \$1 billion healthcare system, and Detroit's secondlargest employer. DMC consists of seven member hospitals, as well as numerous satellite centers. We are affiliated with Wayne State University School of Medicine.

Within our IS Division, you can expand your skills working on a wide range of leading edge projects. We are in the process of consolidating all information systems, and implementing new systems in Patient Care, Materials Management and Pharmacy.

In order to be successful in this aggressive undertaking, we will need the knowledge and skills of IS professionals in a wide variety of areas. This includes:

- Project Managers
- Product Managers
- Computer Operators
- Systems Analysts
- Applications Analysts

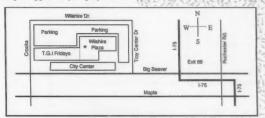
Senior Programming Analysts

- Systems Programmers
- Telecommunication Analysts
- Information Systems Coordinators

Job-related healthcare experience is strongly preferred.

The DMC offers a very attractive salary and benefits package. The strength and depth of DMC can provide you with outstanding growth opportunities.

If you're interested in discovering a new system for success, bring your resume to our Open House on October 4th and 5th at our Information Systems Division in Troy. If you are unable to attend, please send your resume to: Andrew Wallag, The Detroit Medical Center, Human Resources Dept., 4201 St. Antoine, 9C-UHC, Detroit, MI 48201. Equal Opportunity Employer M/F.



DMC

Wayne State University

The Detroit **Medical Center**

Results.

Computerworld gives recruitment advertisers results. Weekly. Regionally. And Nationally.

To place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

> Weekly. Regional. National. And it works.

Systems Analystis) (Varying client job sites in South and Southeast. In the state of the state o

SCT Corporation

If you're looking for an organization with a future as bright as your own...

.you should consider a career with Systems & Computer Technology Corporation, a \$120 million computing management and software company. SCT has 25 years of experience developing innovative solutions to the complex information systems needs of local governments, utilities and higher education. Our continued, rapid expansion has created several exceptional opportunities at our operating facilities located throughout the United States. Some of these positions will afford the opportunity for international travel and/or

CONSULTANTS Utility Systems

SCT Utility Systems, Inc., has interesting, technically challenging opportunities for individuals who have previous experience with customer information systems, preferably within the utility industry. Previous exposure to ORACLE, DB2 or other relational data base technologies would be a significant asset.

TECHNICAL CONSULTANTS Project Management

Several positions are available for individuals whose backgrounds clearly demonstrate strong project management skills and a thorough understanding of ORACLE and DB2. These positions require 5 - 10 years directly related experience along with well-developed analytical and communication skills. Higher education, local government and/or utility industry experience

PROGRAMMER ANALYSTS ORACLE, SQL*FORMS, C & DB2 **Entry, Intermediate & Senior Levels**

Several positions are available for Programmer Analysts who have experience with ORACLE, SQL*FORMS, C and DB2 programming. Candidates should have a BS in a related discipline along with strong analytical and communication skills. Higher education, local government and/or utility industry experience would be an asset.

Please forward your resume, indicating salary history and geographic preference, to: Corporate Recruiting Dept. CW39-CP, Systems & Computer Technology, 4 Country View Road, Malvern, PA 19355. Equal Oppty. Employer, M/F/D/V

OPPORTUNITIES

Technology Consulting, Inc. is a dynamic and rapidly growing Software Development Company with challenging assignments. Our immediate and continuing needs are:

SYBASE/CLIENT SERVER (TRAINING AVAILABLE)

- offers competitive salaries, attractive bene-and relocation assistance. For considera-send resume or call:

Colorado Oregon Arizona Opportunities **Applications**

Development

- CICS/VSAM/COBOL/SAM/COBOL/Batch DB2/CICS or DB2/CS/ MODEL 204
- oking P/As (37 pos) gan Banking

Technical Support

DB2 and IMS DBA's DB2 Systems Programmers MVS/ESA Systems Programm

DATRONICS, Inc. Western Region Recruitment Center 151 Kalmus Dr., Ste. C-200 Costa Mesa, CA 92626

Weekly. Regiona And it works!

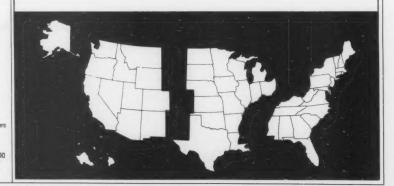
Just four reasons why more companies run more recruitment advertising in Computerworld than in any other specialized business newspaper.

For more information or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).



Weekly. Regional. National. And it works.

An IDG Communications Publication



COMPUTER HARDWARE CUSTOMER ENGINEERS

Major Fortune 50 Company specializing in the third party installation, maintenance and repair of Automated Data Processing Systems -specifically IBM System 36 and IBM PC/clones specinically BM systems to and IBM PL/Coones
has immediate opportunities in Southern Callfornia; New York; Dallas/Ft. Worth; Washington,
OC; Burlington, VT; and Brownsville, TX for 1-2
Customer Engineers. Must have familiarity with the
hardware installation of IBM Systems 6, systems,
LANs and IBM PC/clones, as well as MacIntosh PCs, for a major local company. The majority of the work will be "on-call", as well as "on-site", and may involve other nearby facilities during the normal work week. Some weekend work may be required.

The candidates we seek will be HARDWARE-

oriented Customer Engineers with 4-6 years experience in the installation, maintenance and repair (down to board level) of this equipment. (NOTE: Software candidates need not apply since these are strictly hardware positions). Should have the capability to obtain the necessary security clearances, excellent customer service and the capability to work with the customer resolving their operational problems. Prefer candidates with specific IBM System 36 training and a two year technical degree, along with the specific experience mentioned above.

Become part of a solid, dynamic ADP services organization. Interested candidates should send a cover letter listing your specific hardware a cover lecter is turning your Spectric martiwary installation/maintenance/repair background, your availability and your salary requirements. We ofter an excellent cafeter is benefits plan. For confidential consideration, send resume and cover letter to: CW-117414, Computerworld, Box 9171, Framingham, MA 01701-9171. EOE/MFDV.



CLIENT/SERVER **OPPORTUNITIES**

Fast growing South Florida Systems Integrator looking for quality developers with experience in Client/Server Application Development:

- GUI Development tool (e.g. PowerBuilder),
 Relational Databases (e.g. Sybase),
 LAN and Telecommunications experience a plus, and
 Big 6 Consulting experience a plus.

Must be willing to relocate to South Florida or Chicago area. Aggressive compensation and benefits packages for qualified candidates. Please send resumes to:

The Systems Consulting Group, Inc. HR Dept, ET02, 760 NW 107th Ave, Suite 310 Miami, FL 33172

Systems Analyst to analyze, design, develop, code, test, and auppor User Interface, Report, and Barber Interface, Report, and Interface, Inter

Systems Analyst - Salary:
\$35,000.00 per year. Hours: 8:00
am to 5:00 pm - weekdays. Position available for a Systems Anation available of a Systems Analysis
see Analysis of Analysis of Analysis
see Analysis of Analysis of Analysis
see Analysis of Analysis of Analysis
and convert it to programmable form and convert it to pro
grammable form and conve

Maximize your potential with MANMAN/X.

The ASK Group is a leading independent software company providing the world's most popular and extensive portfolio of business applications. In response to the overwhelming introduction of MANMAN/X, our North American Support Services division is staffing up for the ongoing MANMAN/X implementation and customer service effort. Pull-time regular positions are headquartered in Atlanta, Baltimore, Boston, Chicago, Dallas, Houston, Philadelphia, Portland, Seattle, and throughout the Bay Area and Southern California.

For the following critical positions, you will interact with all levels of management to identify and recommend business solutions, giving prospects and customers a competitive edge and improving their organizational efficiency. We're seeking creative and resourceful professionals with exceptional analytical and problem solving ability. Ideal candidates will be technically sophisticated communicators who are flexible, responsive and, most of all, dedicated to the seeing complex customer projects through to completion. Travel will be required.

Database Consultants

You will install, configure, and tune INGRES relational databases. Additionally, you will also provide training and consultation on INGRES and other relational databases. To qualify, you must have 3+ years' related experience in the RDBMS environment. In-depth understanding of SQL and strong UNIX experience are essential. Strong working knowledge of networking applications and prior vendor experience are required. A BSCS or equivalent and demonstrated ability to perform individual and group training are highly desirable. Job Code: CW1.

Tools Consultants

Train and consult with customers on development and customization of MANMAN/X applications using code generator and 4GL. Three or more years' hands-on tools experience developing business/financial applications and relevant life cycle experience including design, development, debug, etc. are essential. Demonstrated experience with Windows 4GL, Motif and other development tools desired. Manufacturing systems experience should be complemented with strong working knowledge of networking applications, UNIX Operating Systems, and Relational Databases. A BSCS or equivalent and previous hands-on technical training experience are a must. Job Code: CW2.

Systems Consultants

You will install MANMAN/X software and load new releases, as well as teach customers how to use MANMAN/X system tools. Candidates must have 3+ years' extensive UNIX experience including supporting complex UNIX installation sites and prior experience as a Systems Manager. Other requirements include hands-on experience with the following: performance tuning, kernal configuration, relational technology, and networking applications. A BSCS or equivalent and demonstrated ability to perform individual and group training are highly desirable. Job Code: CW3.

Implementation Consultants

Work with customers to manage implementation projects for our advanced manufacturing and financial systems. Requires a college degree or equivalent and 5+ years' relevant experience in one or more of the following: master scheduling techniques, Job Shop/JIT manufacturing technologies, and financial reporting, as well as inventory, purchasing and order administration systems. Strong project management and communication skills are essential. Job Code: CW4.

Manufacturing Consultants

Work with sales representatives to provide a 'solution sell' to customers including preparing and conducting customized presentations and product demonstrations on two or more hardware platforms, as well as on-site consultation. Requires a college degree or equivalent and 5+ years' experience in one or more of the following: manufacturing systems pre-sales, manufacturing management with MRP systems, and/or manufacturing planning, MRP consulting, financial reporting, and inventory/purchasing/order administration systems. APICS certification and strong working knowledge of ASK product offerings are highly desirable. Job

Education Consultants

Deliver customer education classes for MANMAN/X Manufacturing Applications at ASK Group facilities and at customer locations, as well as consult with customers on application and implementation issues. To qualify, you must possess a BA/BS degree in Business, Computer Science, or equivalent and 3 - 5 years' experience with manufacturing systems. Strong communication, presentation, and problem solving skills are essential. Previous training experience and a good working knowledge of UNIX are preferred. Job Code: CW6.

High profile careers like these don't come around too often. So take advantage of this opportunity and discover why everyone is right profile Carees like tiles of the Content and advantage of the stability of the Content and a discover in the power of MANMAN'X. The ASK Group offers an excellent compensation and benefits package including stock purchase and 401(k) plans. For immediate consideration, mail or FAX your resume, indicating Job Code, to: ASK Group, 2440 W. El Camino Real, Mountain View, CA 94039-7640. FAX: (415)390-0596. For other career opportunities with the ASK Group call our Job Hotline at (415)335-5200. An equal opportunity/affirmative action employer. M/F/D/V. Principals only. No phone calls.



Computerworld recruitment advertising works!

That's because more computer professionals read more recruitment ads in Computerworld than in any other newspaper.

For more information or to place your ad, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Weekly, Regional, National, And it works.

DSM, ISM, MSM, GTM, IBM RISC/6000, Powerbuild Fulltime/Cone

STRATEM 800-582-JOBS TEL (212)967-2910 FAX (212)967-4205 124 W. 30th St. Suite #3 New York, N.Y.10001

OPPORTUNITIES SOFTWARE

WE HAVE MORE OPPORTUNITIES ACROSS THE NATION BECAUSE WE ARE ACROSS THE NATION.



- · AS/400, BPCS...CASE

- AS/400, TCP-IP
 DB2/CICS/TELON
 MF COBOL & FOCUS P/As
- COBOL/UNIX
 MS WINDOWS
- VISUAL BASIC
- POWERBUILDER/SYRASE
 FOXPRO/CLIPPER/
- **FROGRESS** · ADABASE/NATURAL
- · ADA COMPILER
- TANDEM
- · C/UNIX/JAM

- . BANKING (ALL AREAS)
- · NETWORK ADMIN
- · ALPHA ENG'R
- UNIX/TRUSTED SYSTEMS
 UNIX/RELEASE ENG'R
- · DG/AOS SYS MGR
- C/UNIX/PERL SCRIPT
 VAX/PROJ MCR
- · OS2/LAN SVR/GUI
- NOVELL CNE
 UNIX/NT PORTING
- · SYBASE/DB-LIB/C
- · PC/FORTRAN P/A
- · MS ACCESS

f you are seeking quality software consulting opportunities in your area, The Computer Merchant, Ltd. can provide them to you. With opportunities throughout the United States in big cities and small towns alike, you won't have to travel far to enjoy the challenging consulting projects The Computer Merchant offers. As a Computer Merchant consultant, you'll be part of the recognized source for expert consulting services. Since 1978, Fortune 500 companies have called on Computer Merchant consultants for immediate short-term help and long-term solutions in both standalone and networked environments. The majority of our clients are repeat business and referrals and include all major computer vendors.

Computer Merchant consultants know that with headquarters in Norwell. Computer Merchant consultants know that with headquarters in Norwell, MA and regional offices in Chicago, Atlanta, Los Angeles and now Washington, D.C., support is always available. By maintaining open lines of communication among our regional offices, our consultants, and our clients, project success is assured. Expertise, experience, teamwork, and service are the keys to success for Computer Merchant consultants. Software professionals with at least 3 years of experience looking for a chance to move ahead without moving around, contact The Computer Merchant, Ltd. office in your area, or fax your resume to us at our corporate headquarters.



THE COMPUTER MERCHANT, LTD.

CORPORATE HEADQUARTERS

80 Washington St., Bldg. S. Norwell, MA 02061, (617) 878-1070, FAX: (617) 878-4712

ATLANTA 449 Pleasant Hill Rd., Suite 301 Lilburn, GA 30247, (404) 279-8009

LOS ANGELES

180 Newport Center Dr., Suite 180 yport Beach, CA 92660. (714) 720-8435

625 North Michigan Avenue. Chicago, IL 60611, (312) 751-4299

WASHINGTON D.C. Rivers Technology Park, 9101 Guilford Ros Columbia, MD 21046, (301) 490-7974

Looking for qualified computer professionals?

Look no further. More than 629,000 computer professionals read Computerworld every week. And you can reach all of them -- or just the ones in your region -- with a regional or national recruitment advertisement in Computerworld's Computer Careers section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Nancy Percival, 508-879-0700

NEW YORK: Mack Center 1, 365 West Passaic St. Rochelle Park, NJ 07662, Valerie Galbo, 201-587-0090

WASHINGTON, D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031, Katie Kress, 703-573-4115

CHICAGO: 10400 West Higgins Road, Suite 300, Rose mont, IL 60018, Patricia Powers, 708-827-4433

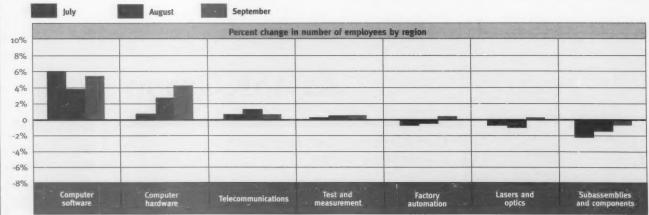
LOS ANGELES: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.



Computerworld/CorpTech Career Index

The month of September produced a hiring surge in many technology industries



© Copyright 1993, Corporate Technology Information Services, Inc., Woburn, Mass.

Strategize **Your Next Move**

Make your next career move to AGS Informa-tion Services Inc., a NYNEX® Company. We have 50 office locations that can offer a diveristy of choices for qualified professionals.

AGS is a national leader in the implementation of applications and systems software. We offer IS professionals the opportunity to work with leading-edge technology. We have many exciting development opportunities for the skills

- ORACLE DBA ORACLE CASE ORACLE, SQL* Forms
 • ORACLE 6.0, 7.0
- ORACLE Financial
 - PowerBuilder ObjectView
 - SYBASE SQL* Windows

For more information on strategizing your next career move, please contact us and indicate your geographical preference:



Aftn: National Recruiter
AGS Information Services, Inc.
139 Spruce Drive
Mountainside, NJ 07092
1-800-HIRE-AGS
FAX: 908-654-9794

An Equal Opportunity Employer M/F/D/V California Colorado Connecticut Delaware Florida Georgia Illir na Maryland Massachusetts Michigan New Jersey New York North Carolina Ohio Pennsylvania Texas Canada UK



EXCELLENCE IN SOFTWARE CONSULTING

We're the Registry, a dynamic, rapidly growing software consulting company dedicated to excellence Our solid reputation is built on our commitment to understand and meet the needs of our clients and consultants, and to provide superior service to both on a day-to-day basis.

> National Contact: Dan (800) 248-9119 FAX (617) 527-8805

Contact: Jeff | (800) 255-9119 FAX (404) 257-05 MS-WINDOWS C+++ ** IMS DB2 ** ORACLE C ** RISC 6000/C ** PEOPLESOFT HR ** ASSEMBLER CICS

Boston, MA Contact: Kevin (800) 248-9119 FAX (617) 527-8805 SMMP DEVELOPMENT • POWERBUILDER • SYBASE C++ • ORACLE UNIX C • AS/400 INTERNALS • MS WINDOWS C++

Chicago, IL Contact: Bill (800) 677-9119 FAX (312) 558-1388 OBJECTIVE-C • TECH WRITERS • MS-TEST • ORACLE/SYBASE • AS400/ASI • POWERBLJILDER

Cleveland, OH Contact: Ed (216) 328-9900 FAX (216) 328-9338 HOGAN • UNIX/C • MICROFOCUS COBOL • DB2/SQL •
ORACLE • C++/TURBOVISION • DB2 DB4/SYS TUNER

Dallas, TX Contact: Chris (800) 456-9119 FAX (214)497-9053
POWERBUILDER/SYBASE * UNIX/SMALLTALK * WINDOWS/SDK * TESTERS/MICROSOFT TEST * RELATION/AL/DATA MODELER Durham, NC Contact: Lori [800] 338-9119 FAX [919] 544-9668 UNIX/C/ORACLE/X • POWERBUILDER • SAP/R-3 •

DB2/IMS/COBOL • OA TESTER • SYBASE TRANSACT SOL Contact: Sue (800) 544-9149 FAX (914) 937-EASEL • POWERBUILDER • DATA MODELER • NOMAD • HOGAN • CRACLE • MS-WINDOWS/SDK • ADA/SYBASE • IEF OF BACHMAN FAX (914) 937-3314

Richmond, VA Contact: Skip [800] 220-9119 FAX (804) 346-0510
DALOG MANAGER/CLIST * BUSINESS ANALYSTS/MORTGAGE *
GUI DEVELOPMENT * SYBASE DBA * DBZ/APS * DBZ/CICS

San Francisco, CA Contact Mike (800) 248-9119 FAX (617) 527-8805 C/RDB/DECFORMS = OS-2/PM/C/C++ = ORACLE DBA = VISUAL BASIC = MS-WINDOWS/SDK/C = ORACLE/FORMS/REPORTWRITER

South Florida Contact Tony (305) 779-1500 FAX (305) 728-3457
AS/400/RFG or COBOL • POWERBUILDER • ADW • SPEEDWARE •
SMARTSTAR/RMS • CICS/D82 • ORACLE FINANCIALS

Washington, DC Contact: Kris [800] 367-9119 FAX [703] 790-8467

ORACLE DRA • SEQUENT OPERATORS • IEW/IEF • GUI/AVT •

UNIX/C/RDB • ORACLE/SOL

Find out what it's like to consult with a company that's building long-term relationships based on quality, strength, integrity and vision.

The Registry

189 Wells Avenue, Newton, MA 02159 (617) 527-9119 FAX: (617) 527-8805

Member NACCB An Affirm ve Action/Equal Opportunity Employ



Research and Development **Project Leader**

Project Leader
The University of lowa Center for
Computer Aided Design seeks an
experienced Research and Develman and the Computer Aided Design seeks an
experienced Research and Develmate software system integration
and software system integration
and software engineering aspects
of operator-in-the-loop simulator
systems for ground whices and
related equipment. Responsibilities include software integration of
and by various Center research
projects. Candidate will provide
isadership in the conduct of general research and development
activities to refine and extend the
Center's core simulator software
technologies.

technologies.

Requirements for the position include an earned M.S. degree include an earned M.S. degree includes a series of the series of th

THIS SPACE **FOR HIRE**

Call today to place your recruitment ad.

800-343-6474 (in MA, 508/879-0700)

Systems Analyst - Design and develop accounting database package using Sybase on Sun workstations for internal use, system administration of network for Sun workstations, and installation and maintenance of Sun workstations and maintenance of Sun workstations using NFS and NIS, design and develop user interface using X-region of the State of S

FLORIDA Opportunities

FOXPRO 'SQL

*POWERTHOM' 'COBOL 'JCL

CELULIAR ACCESS BILLING
TANDEM 'TAL *PATHWAY
ORACLE 'MICROSOFT C

C 'OS/2

#P3004 'COBOL 'UNIX

OPWERBUIDER 'SYBASE
SYBASE 'UNIX 'C

*WINDOWS

· COBOL · RPG 400

"JDE
IDMS ADSO "DB NAVIGATION
UNIX "C "BUSINESS APP
COBOL II "DL'1 (IMS)
PICK "or PRIME INFO
OS'.2 "C "PM" XVT
FOXPRO "COBOL WINDOWS QUICK BASIC ' UNIX

COMPUTER BUSINESS ASSOC

Systems Engineer, 40hrs/wk, 9am,
-5pm, 948,000/year. Design, develoimplementation and documentation of advanced software for business applications. ISPF/DMS panel codiadvanced software for business applications. ISPF/DMS panel codicode of the committee of

SYSTEMS ANALYST

SYSTEMS ANALYST

Provide system analysis, database design/development/implementation/maintenance/tuning/
due to the system and the system of the system of

ATLANTA

Fee Paid & Relo Assistance! CUPPER 5.01

Programmer and Systems
Analyst opportunities with
Atlanta based Fortune 500
information services company. Develop complex
multi-user systems networked to the IBM mainframe. To \$49,000.

frame. As:400 As:400 As:400 As:400 Take opportunities with 5 great opportunities with 5 ries. Positions range from programmer (one year AS) 400 work exo, required to Project leader. Cobol or RPG. To \$52,000.

ADABAS.

New Systems Analyst on-

ADABAS

New Systems Analyst opportunities due to expansion
of Atlanta "Landmark" comparry. Design and build Natural systems feeding Windows-based network.
To \$49,000.
Contact Glee Frank

Contact Glen Frank Call 404/393-9933 Fax 404/668-0384

MATRIX

INTERNATIONAL **OPPORTUNITIES**

ANALYSTS & PROGRAMMERS

experience using: MVS, IMS DB/DC, DB2, VTAM, SQL, ORACLE, or COBOL. Knowledge of CASE, TELON, ADW, CASE, PL/I, and UNIX

Also OOP, Imaging, CD-ROM client server and training spe

Excellent tax free salaries transport allowances, openings are immediate so fax or mail



STATE OF MAINE DATA PROCESSING CAREER OPPORTUNITIES

Senior Database Analyst (088300) \$31,819 - 43,662/yr.

The State of Maine is accepting applications for current vacal within the Bureau of Information Services in Augusta, Maine.

Senior Database Analyst - This position is responsible for designing, implementing, and maintaining complex databases as well as serving as a consultant and technical resource to other professional retentional data processing personnel. Preference will be given alternitive data processing personnel. Preference will be given to applicants with substantial experience with DB2 and/or Oracle. Cualifications include 8 years of progressively responsible programming experience to include a minimum of 4 years experience in database analysis, design, maintenance and tuning as described in the Careers Opportunity Bulletin.

Completed applications and supplemental qualifications must be re-ceived in the Bureau of Human Resources by 5:00 p.m. October 18, 1933. Application materials, career opportunity bulletins, and supplemental qualification sheets are available at all Maina Job Ser-vice Offices of by contacting.



STATE OF MAINE BUREAU OF HUMAN RESOURCES STATE HOUSE STATION NO. 4 AUGUSTA, ME 04333-0004 (207) 287-4421

The Registry

AN FEO/AA EMPLOYER M/F/H



"...From our last two Computerworld recruitment advertisements alone, we hired a number - Renee Southard of new recruits."

Manager of Staffing & Placement Keane Inc.

A project-oriented consulting company based in Boston, Keane Inc. designs, develops, integrates, and maintains software for both commercial and medical applications. Its largest operating unit, Information Services Division (ISD), provides customized services to Fortune 1000 companies, insurance firms, and financial institutions. KeaMed Hospital Systems Division (KeaMed), on the other hand, supports a full line of software products for hospitals.

To maintain its premier level of service, Keane employs nearly 1400 professionals in 20 offices throughout the East, Midwest, and Southeast. For Renee Southard, Manager of Staffing and Placement, Keane's aggressive growth plans require recruiting an average of 450 to 500 new employees each year.

"Although our recruitment needs vary from branch to branch, we're generally looking for a wide variety of skill sets - everything from programmers to systems analysts. Keane is always recruiting qualified candidates to fill specific positions, but we also advertise for marketing purposes. That's why we've been running in Computerworld for three years.

"Computerworld gives us the best of everything...exposure and qualified response. In fact, from our last two Computerworld advertisements alone, we hired a number of new recruits. With our current schedule of four or six Computerworld recruitment advertisements per quarter, we're getting the hiring success we need - where we need it.

"Computerworld continues to play a critical role in helping us find the right type of individuals and build up our pipelines. At Keane, we see Computerworld as an important part of our recruitment advertising -both now and in the future."

Computerworld. It's where serious employers - like Renee Southard - reach qualified candidates with key computer skills. Every week. Whether you use computers, make computers, or sell products and services for computers, Computerworld can help you recruit the experienced professionals your business demands. For all the facts, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

COMPLITERWOR

Where the qualified candidates look. Every week.

1 800 343-6474 IN MA 508 879-0700

COMPUTERWORLD

INSIDE

COMPUTER CAREERS

The hotel welcome mat is out



Marketplace

the PRICE for A

Even though they're in the minority, some consultants don't have your best interests at heart

By Dan Allen

As a rule, information systems management consultants display the highest integrity. They work hard, bill their time accordingly and are generally on the up and up.

On occasion, however, a few stray from these good intentions. They overstate their abilities, hide unflattering truths and allow their clients to act as the check and balance on their activities. Luckily, those consultants are few and far be-

To guard against questionable practices, it's important to understand how consultants bill their time. Each day, they must charge eight hours to one or more project codes. The goal is to charge as much as possible to paying client codes and avoid charging to nonclient codes such as training and proposal development or to codes with no budget.

Because the number of billable hours is used as the basis for promotions and firings, some consultants pad their figures. Asking for detailed time accounting reports may help, but consultants know how to play the game.

I was once on a 30-member consulting team conducting 10 simultaneous, independently contracted projects for one client. The combined fee ran slightly more than \$1 million, and the client insisted that the team track its time. Some projects ran wildly over budget, while some ran significantly under. We itemized the bill by project, but it didn't accurately reflect our time, so we adjusted it. It also didn't hint that 15% of the fee funded the time it took to fabricate the bill. Essentially, we billed the client about \$150,000 for devising

the elaborate scam. Start-up budgets

If we had mentioned the budget discrepancies, the client might have considered some items frivolous. For instance, one of the most undervalued and underbudgeted activities was the time required to get a project off the ground. Consultants usually include a few days as a token start-up budget for a three-month engagement, but prepara-

tion can take more like a month. Start-up time includes courtesy calls to client personnel and studying information to understand the project's goal. In this case, if the client had known we spent a month getting started, we might have looked incompetent.

In the above example, the client was satisfied with the results, but none of the day-to-day team members had significant experience in the client's industry

or generic issues. Our expertise consisted of brokering agree-

ments among the various organizational groups, often rubber-stamping the views of the most influential. It was our contribution to the reputation consultants have for doing little more than writing down what the client says and parroting it back. While parroting, or more politely, reflecting, is legitimate and

potentially valuable, the service requested was significantly more sophisticated.

At times, certain practices almost cross clear ethical boundaries. For instance, we brought in an expert shortly before the end of a

three-month, \$100,000 project. The expert found the draft project recommendations so out of date that he recommended starting over. Instead of telling

the client and risking our credibility, we went forward with an amateurish report and the expert, who was also a partner at our firm, backed us up.

Proceed with caution

Of course, none of this should dissuade you from using consultants. Currently. I'm working with four different consultancies, and I can't imagine the project succeeding without them.

You must understand that they are human; deal with them in an open and candid way, and avoid putting them in a position where your interests conflict. If the client with the 10 subprojects had realized how difficult it is to track 30 people's time across 10 projects, he wouldn't have asked for such a detailed report or at least would have been directly involved to ensure its integrity.

You must also be willing to work openly to adjust budgets as variances are identified. In our case, there should have been no embarrassment. The client would have probably understood that project estimates are rarely accurate and would not have pressured us to keep to an unrealistic budget.

Finally, there are two primary defenses to protect against phony expertise. First, establish long-term relationships with consultants so you can come to understand their strengths and weaknesses. Second, become enough of an expert yourself to recognize a con when you see one.

Allen is a former management consultant.

Buy / Sell / Lease

With Computerworld, you can make your next trip to the library without leaving your desk.

Computerworld introduces CW Online, a comprehensive, fully searchable library of Computerworld articles. With CW Online, you can search the three most recent years of Computerworld issues. And the service is updated weekly, so you can access new information every week. Research has never been so easy, so complete or so economical. Right from your personal computer.

The Online start-up kit costs just \$25.00 and includes everything you need to start using CW Online including easy-to-use communications software. After that, you'll be charged for access time along with a \$5.00 monthly account service fee. You can even set your account up for us to bill your credit card or invoice your company on a monthly basis.

Call today for your CW Online start-up kit including communications software

A library of **COMPUTERWORLD** articles

For more information or to order call 800-643-4668 today.

DEMPSEY. WHERE IBM QUALITY IS SECOND NATURE. BUY-LEASE-SELL

- · RS/6000
- · SERIES/1
- · SYSTEM 36/38
- . 9370
- · INDUSTRIAL PC
- · ES/9000 · AS/400
- · Processors
 - · Peripherals
- Upgrades

For pretested equipment, flexible financing, configuration planning, technical support and overnight shipping call

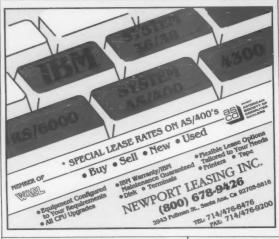
(800) 888-2000.



18377 Beach Blvd., Suite 323 * Huntington Beach, CA 92648 * (714) 847-8486 * FAX: (714) 847-3149

Authorized Integrator

Buy / Sell / Lease



Short Term COMPUTER Rentals on all MARKETPLACE New & Used digital BUY, SELL, LEASE & RENT **Equipment** Tem'

Systems, Peripherals, Parts & Services

Specializing in:

- RISC System/6000 (1 month rentals
- available) Workstations
- AS/400 · System/36
- · Personal Computers Data Communications
- . U. P. S. Systems · Peripherals
- Upgrades
- · Parts

COMPUTER MARKETPLACE

800-858-1144 Ext. 97 Computer Marketplace prides itself on bein your one call computer hardware solution.

Corporate Headquarters 205 E. 5th St., Corona, CA 91719 • 909-735-2102 Computer Marketplace East 209-742-6848

CDLA Official UDS/M Communication Divis

digital

Official LIDS/Motorola Distributor

PROPERTY New & Used — Computers ·Peripherals Upgrades

Buv • Sell • Rent • Lease

(800) 745-1233 SPECTRA

(714) 970-7000 (714) 970 7095 Fox

Anaheim Corporate Center 5101 E. La Palma Ave., Second Floor Anaheim, CA 92807

Executive Infosource!

LARGE INVENTORY INCLUDING:

9221/120 9221/150 9221/130 Extensive stock of features

Call us for your 9370/9221 needs. **Executive Infosource!**

CDLA

708 215-9370 Fax: 708 215-9992

Buy/Sell/Trade Data General MV and AVIION

Systems and All Peripherals RAID Disk System by HiPerStor

Compatible with: Data General, SUN, HP, Novell & many others.

international Computing Syst (800) 522-4272 Fax (612) 935-2580

Over 629,000 computer professionals read Computerworld weekly.

It's the **PRODUCT CLASSIFIED PAGES**

Reach Computer Professionals Where They Shop For:

- Hardware
 Peripherals/Supplies
 Graphics/Desktop Publishing
 Bids/Proposals/Real Estate
 Business Opportunities
 Used Equipment
 Listings

CALL NOW! (800) 343-6474 (In MA., 508/879-0700)

ANOTHER REASON WHY COMPUTERWORLD PRODUCT CLASSIFIED PAGES WORK ...

Computerworld's Product Classified Pages penetrates computer using companies in all key industries. Because Computerworld's total audience blankets key vertical markets that are major users - and major buyers - of computer products and services.

Computerworld's Total Audience by Industry

Manufacturing (excluding computers)	
Finance, Insurance, Real Estate	50 145
Education, Medical, Legal	24 427
Wholesale & Retail Trade	
Business Services (excluding IS)	
Government	62,291
Utilities, Communications Systems,	
Transportation Services	
Mining, Construction, Petroleum & Refining	
Manufacturers of Computers & Peripherals Systems Integrators, VARs, Computer	63,550
Service Bureaus and Consulting	.100,673
Computer Dealer, Distributor, or Retailer	16,989
Other	28,313
Total	629,204

To place your ad, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

PRODUCT CLASSIFIED

WE BUY

Call for the Most Competitive

Prices

CSI

Compurex Systems, Inc. 83 Eastman Street Easton, MA 02334

1 800-426-5499

In MA: (508) 230-3700 Fax: (508) 238-8250

- HP 9000
- Data Products
 PC's Workstations
- AND WE SELL IT TOO!



(617) 982-9664 FAX (617) 871-4456

REFURBISHED USED

- **O LIPS SYSTEMS**
- STANDBY GEN SETS
- · LIEBERT A/C • ACCESS FLOORING

262 S. Military Trail Deerfield Beach, FL 33442 1-800-226-0784 305-425-0638

Index of used computer prices

Week ended September 17, 1993

	Closing Prices		
	BoCoEx	AmCoEx	
IBM PS1 386SX/25	\$850	\$700	
PS/2 Model 70-A21	\$750	\$775	
PS/2 Model 55SX	\$650	\$700	
ThinkPad 700C	\$3,000	\$3,400	
PS/2 Model 90-OH9	\$1,700	\$1,525	
PS/2 Model 95-OJF	\$3,000	\$2,650	
Compaq Prolinea 4/66	\$2,000	\$2,100	
Prolinea 486/50	\$1,450	\$1,575	
Portable 386	\$650	\$650	
SLT-386	\$925	\$850	
LTE-286	\$575	\$600	
Prosigna 486/66	\$6,000	\$3,650	
Apple Macintosh SE	\$550	\$500	
IICX	\$1,300	\$1,000	
IICI	\$1,950	\$1,475	
HFX	\$2,300	\$1,700	
Quadra 950	\$3,400	\$3,900	

INFORMATION PROVIDED BY BOSTON COMPUTER EXCHANGE, BOSTON, MASS., AND
AMERICAN COMPUTER EXCHANGE, ATLANTA, GA.

COMPUTERWORLD **Product Classified** Pages

gives you buyers with extensive purchase influence.

In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in Computerworld's Product Classified Pages!

For more information, call (800) 343-6474 (in MA, 508/879-0700)

Software

New Help Desk Software

Free SUPPORT EXPRESS™ eval to first 500 qualified callers!

- Knowledge Base Design
- SpeedSearch™ Enabled
- Standard & Custom Reports
- Network Messaging
- Easy Set Up / GUI Interface
- Import / Export

See us at Networld Booth #1029 SOFTWARE MARKETING GROUP, INC.

DOS OF Windows Based



08 Third Street / Des Moines, Iowa 5030 1(800)395-0209 / FAX (515)284-5147 COMPUTERWORLD

Product Classified Pages delivers your message

in companies that plan to buy your **PAGES** product or service. From PCs to minis, main-

frames to supercomput-ers, Computerworld's readers buy products across all ranges of to-day's computers. So if you're selling, advertise in the newspaper that delivers readers plan to buy YOUR prod-uct or service. Advertise in Computerworld's Prod-uct Classified Pages!

> For more information, call:

(800) 343-6474

Bids / Proposals / Real Estate

New 2.0 Version

Single User

\$1495

LAN System

\$2495

PRODUCT CLASSIFIED

Where America's Computer Professionals Shop

(800) 343-6474

FISA IS LOOKING TO DO BUSINESS WITH YOUR COMPANY;

The New York City Financial Information Services Agency wants to add to its vendor lists for DP goods and Interested? services. Write FISA at 111 8th Ave. NYC 10011; attn: Ms. Millie Nieves

SOLUTIONS DIRECTORY!

Increase your sales! Advertise 26 weeks in Computerworld's new Solutions Directory. Just \$499 for all 26 weeks

800 343-6474 ext. 744

Time & Services



ALICOMP, INC.

The "Boutique" of the Computer Services World

VM, MVS, VSE

Outsourcing/Timesharing/Consulting Remote and On Site

Two State of the Art Locations

20,000 sq. ft. Manhattan complex 100,000 sq. ft. Secaucus, NJ complex

"Our Platform is Excellence"

Serving Clients Since 1980

(212) 886-3600 • (800) 274-5556

COMPUTERWORLD

Product Classified Pages give you buyers with extensive purchase influence.

In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the en-tire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buy-ers with volume purchasing influence. Advertise in Computerworld's Product Classified Pages!

For more information, call (800) 343-6474 (in MA. 508/879-0700)

MPUTERWORLD PRODUCT CLASSIFIED

Most vendors

have well-equipped data centers...

They have large systems with the software you need, plenty of MIPS, and UPS systems.

ONLY ONE WILL EXCEED YOUR EXPECTATIONS

Only one runs your work as its own. Only one minimizes your risk and maximizes your cash flow. Only one will get the job done totally. CSC CompuSource - dedicated to outsourcing since 1980.

YOU'RE IN CONTROL WHEN YOU PUT US IN CONTROL

CSC

CSC CompuSource A Unit of Computer Sciences Corporation

110 MacKenan Drive Cary, North Carolina 27511 919, 481, 9341

COMPUTING **Extensive Software Library**

Telenet Tymnet
Searsnet IBM Information Network

Extraordinary Customer Service Migration Management

SYSTEMS

(formerly) **GIS**INFORMATION SYSTEMS, INC

Your best choice for mainframe computing services 815 Commerce Drive, Oak Brook, IL 60521 708-574-3636

MVS

MA

VSE

DB2

IMS/DBDC

CICS

TSO

ICCE

Product Showcase



COMPUTERWORLD's "5th Wave" Cartoon Mouse Pad

COMPUTERWORLD brings humor to a mouse pad featuring a cartoon from "The 5th Wave" series by Rich Tennant. Not available in stores, this colorful foarm-backed pad will keep your mouse clean and protect your desthop. Best of all, it's only \$4.99". Send your name, address and money order to COMPUTERWORLD, P.O. Box 9171, Framingham, MA 01701, Attn: Product Fulfillment. For credit card orders, call 1-800-343-6474.

Residents of MA, CA, GA, NJ, and DC add applicable sales tax.

"Outside U.S., add \$2.50 each for postage and handling."

Unlimited Optical Dis Storage!

30¢/MB+LIFETIME WARRANTY!

- 3.5" 128MB rewritable optical disk drive is FAST and operates just like a hard drive
 Meets ISO-ANSI standards
 1/3 to 1/6 the cost of SyQuest
- No cheaper way to add disk
- storage, backup and exchange data or build multimedia
- OPTO ADVANTAGE
- \$ 799. \$ 899. 128MB External SCSI. Portable 128MB \$ 999.

OPTICAL DISK is the Selection! 1-800-873-VALU



Custom Keyboards.

... For Custom Applications Sun Compatible Keyboards
 Engineering, Development and Production

- Custom Key Caps, Legends, Colors and Housings
 Custom Cables and Connectors
- Integrated Bar Code and Mag Card Readers
 Iso Point® Pointing Device
- Guick Turnoround and Prototypes
 3 Year Limited Warranty

SOLUTIONS FOR YOUR SYSTEM INTEGRATION NEEDS KeySource International
Division of United Plastics Corporation Division of United Plastics Corporation 2391 American Avenue Hayward, CA 94545 TEL: 510-783-6066 800-722-6066 FAX: 510-783-2993

Consultants
 Value Added Resellers
 Marketing Partners
 OEMs
 Systems Integrators
 Distributors

To list your company so that Computerworld's readers can contact you directly, dial 800/343-6474, x744. Basic company listings will appear 26 consecutive weeks for just \$499.

401(k) ADMINISTRATION Delta Data Services, Inc. complete 401(k) Admin Software Columbus, Ga(800) 451-9188 4GL CompuSolve Associates River Edge, NJ	Jerry Cohen & Associates Portland, OR (503) 289-7706 Cracle/C/Cohol/Unix/Forte/OO - I.S. Consultants Minneapolis, MN (612) 851-9544 ORACLE/PARADOX-Offsite Work Preferred Laurel Hill Software Inc. (800) 554-2676 Mastech Corporation: Nationwide	EXECUTIVE INFORMATION SYSTEMS XENOS Corporation Dallas, TX	OFF SHORE SOFTWARE DEV Mastech Corporation: Nationwide Excellent Quality - Cost Effective (412) 279-8400 R Systems, Inc., California (916) 631-1503 "Quality Software Developed in India" SAVE \$\$\$111 Software Sourcing Company Altanta, Georgia
ACCOUNTING/PAYROLL Arthur Ellingsen & Co. Arlington Heights, L	UNIX, RDBM\$, GUI (412) 279-6400 PowerCerv (PowerBuider Specialists) Tampa, FL (813) 281-2990 Software Sourcing Company Atlanta, Georgia (404) 898-7900 CORPORATE/GOVERNMENT BBS Summit Software Services. Inc.	OXKO Corporation Annapolis, MD	OFF-SITE SOFTWARE DEVELOPMENT ORACLEIN-ORINKISYBASELNIFACE:Nultimedia appins. Silverline Industries, Inc., Oakbrook, IL (708) 571-5555 OS/2 SERVICES SOFTWORLD Corp. (407) 995-8436 OS/2 SOftware Development & Consulting
Falls Čhurch, VA	Camarillo, CA	GOV'T/MUNICIPALITIES Arthur Ellingsen & Co. Arlington Heights, I (708) 506-0555 MMA Consulting Group, Inc. Boston, MA	OUTSOURCING Advanced Data Management (800) 824-3772 A full service system integrator. Design through implementation, all major databases and tools. Cell/Write 15 Main St. Kingston, NJ 08528.
APPLICATIONS CONVERSION PC/LAN Database Application Development Envision Development (508) 443-0829 Forecros Corporation San Francisco, CA	CUSTOMER SERVICE The Help Desk, Inc. Phoenix, A.Z. (602) 460-1926 PowerCerv (PowerBuilder-based application) Tampa, FL (813) 281-2990	GROUP WARE/E-MAIL ACR Inc (Lotus Notes VAR) New York, NY (212) 629-3370 Eden Comm., Inc. (Authorized Lotus Notes Dev/Train) New York, NY (212) 489-2450 GUI FRONT ENDS	Computer Utilization Services Corp. Birmingham, At
Avalon Solutions, Inc	DATA CONVERSION Data Conversion, Inc. Minneapolis, MN (612) 525-0649 DBMS	WATERFIELD: PowerBuilder Sales & Consulting Lexington, MA (617) 863-8400 HELP DESK	SPECTRUM Human Resource Systems Corporation Denver, CO(800) 334-5660 PC/LAN Payroll, HR, and Tax Systems STS, Inc. Rolling Meadows, IL (800) 227-2729
Mastech Corporation: Nationwide ORACLE, Sybase, Informix (412) 279-6400 Software Sourcing Company Atlanta, Georgia (404) 898-7900	Advanced Data Management (800) 962-4377 Document DATABASE Tool for the Professionals. We have VAR and Dist programs available. Call/Write 15 Main St. Kingston, NJ 08528.	The Help Desk, Inc. Phoenix, AZ (602) 460-1926 PowerCerv (PowerBuilder-based applications) Tampa, FL (813) 281-2990	PRODUCTIVITY Productivity Management Group, Inc. East Amherst, NY (716) 689-7724 PROJECT MANAGEMENT
Planet Data/Paradox Windows Programming Moriches, New York (516) 878-6603 CABLING SERVICES	INTERBASE/PARADOX Consulting Avalon Solutions, Inc (508) 520-1711 CompuSolve Associates	HUMAN RESOURCE SOFTWARE SPECTRUM Human Resource Systems Corporation Denver, CO(800) 334-5660	Pitagorsky Consulting/Training New York, NY (212) 696-9687
DATA CONNECTION WORLDWIDE-Design & Install Throughout the World (800) 283-2821 Nationwide, 250+ Local Service Locations Premises One LAN SERV (800) LAN-SERV	River Edge, NJ (800) 847-8583 On-Line Systems Group (800) 322-5265 DISASTER RECOVERY	HUMAN RESOURCE SYSTEMS PC/LAN Personnel, Benefit, and HR Systems STS, Inc. Rolling Meadows, IL (800) 227-2729	PURCHASING SOFTWARE Commerce Software, Inc. Elmsford, NY (914) 592-2102x302 RIGHTSIZING
CLIENT SERVER DEVELOPERS ACR Inc. (PowerBuilder VAR) New York, NY	Computer Security Consultants, Inc. Ridgefield, CT. (600) 925-2724 Advanced Information Management (703) 643-1002 Woodbridge, VA FAX (703) 643-2722 Raymond Professional Management, Inc. Roswell, GA (404) 587-4090	INFO DELIVERY SOFTWARE/SVCS GenText, inc. Dallas, TX(214) 691-0300 IMAGING Avalon Engineering, Inc.	UNIX, C, C++, DOS, WINDOWS, PRO-IV Avaion Solutions, Inc (508) 520-1711 PC/LAN Database Application Development Envision Development (508) 443-0825 MCRB Service Bureau, Inc. 3090 Computer Services . (800) 941-MCRB
Hazleton, PA	Recovery Management, Inc. REXSYS® Software (800) RMI-8866 Strohl Systems LDRPS Software (800) 634-2016	Boston, MA	SALES FORCE AUTOMATION Scherrer Resources, Inc. (Sales Ally Software) Philadelphia, PA 19118 (800) 950-0190
Wellesley, MA	EDUCATION & TRAINING GREENBRIER & RUSSEL AS/400, DB2, Client Server (800) 453-0347	ISO 9000 Doc. Mgmt. Systems OXKO Corporation (410) 224-3314	SECURITY National Computer Security Association Carlisle, PA
Greenbrier & Russel (800) 453-0347 Specializing in client server application development in addition to comprehensive maintaine and midraring consulting services, education programs for AS-400, DB2, client server, and software products. Mastech Corporation: Nationwide	IS Training Services (508) 635-9819 Speciating in technical and non-technical training solu- tions and educational consulting services designed to support the entire IS function - including the clients of IS. 40+ years of experience! Contact Boy/3n & Asso- cates, 5 Old Meadow Lane, Acton, MA 01720.	MANUFACTURING SOFTWARE ROI Systems, IncMANAGE 2000 Product Minneapolis, MN 55426 (800) 544-7849 Intrepid Software, Inc. Burlington, MA	RSH Consulting, Inc. Newton, MA
PowerCerv (PowerBuilder VAR) . (404) 551-8210 PowerCerv (PowerBuilder VAR) . (404) 551-8210 PowerCerv (PowerBuilder VAR)	Skill Dynamics, An IBM Company A full service training company that specializes in technical and business training, constiting, outsourcing and customized offerings. Call 1800 IBM-TEACh for a free catalog.	Mari-Traxes - maragement tracking system Open Systems Holdings Corp. (800) 328-2276 PowerCerv (PowerBuilder/Sybase application) Tampa, FL	SECURITY/PHYSICAL Z-Lock Manufacturing Co Redondo Beach, CA 90277 (310) 372-484
Tampa, FL (813) 281-2990 SOFTWORLD® Corporation (407) 995-8436 OS/2 Software Development & Consulting Svcs WATERFIELD: PowerBuilder Sales & Consulting	MIS Training Institute (508) 879-7999 Framingham, MAFax(508) 872-1153 ELECTRONIC DATA INTERCHANGE	MARKETING INFORMATION SYSTEMS	SPEECH INTEGRATION Zeitech, Inc. Stamford, CT(203) 359-980
Lexington, MA (617) 863-8400 Zeitech, Inc. (203) 359-9807	DNS Associates, Inc. Burlington, MA	Advanced Marketing Solutions, Inc. Shelton, CT (203) 925-3038 MIGRATION SOFTWARE/CONSULTING	SUPPLY CHAIN MANAGEMENT American Software, Inc. Atlanta, GA (404) 264-529
CONTRACT PROGRAMMING INFORMIX/ORACLE/SYBASE/UNIX ACJ & Associates	Impact Int'l Technologies, Inc. Princeton, NJ	GenText, inc. Dallas, TX	WHOLESALE DISTRIBUTION Arthur Ellingsen & Co. Arlington Heights, IL

A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting

methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely is competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better -and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who



	10 of today's ob seekers
2 are Active	00
7 are Passive	000000
1 is a Non-mover	0

would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that

reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

More job seekers see your ad in Computerworld than in any other newspaper — Sunday, daily, or trade

That's because *Computerworld* reaches over 629,000 qualified computer professionals every week — the largest audience of its kind, and one that's rich with passive and active job seekers.

That's why more companies advertise more jobs in *Computerworld* than in any other professional newspaper. And why *Computerworld* is the *single place* where America's computer professionals *expect* to see the most jobs every week.

Computerworld gives you regional editions

A key option when you need a regional candidate and want to avoid national response and relocation. Yet if your search is national in scope, *Computerworld* can also give you more widespread national exposure than any other source.



Computerworld needs just 2 working days for your ad to appear

That's comparable to most local newspapers. And why your ad can quickly appear in the next issue to start generating quality response.

Computerworld costs no more than local papers

And with a regional rate of just \$199.42 per inch, your cost-per qualified candidate reached is better than any newspaper. Sunday, daily or trade. Or just about any other source, for that matter.

Computerworld leads candidates to your ad

Just look at this week's Computer Careers section. You'll find a career editorial topic that will stir the interest of virtually any computer job seeker — passive or active. It's just one of countless reasons Computerworld is America's newspaper of choice on computing. No matter how much the times change.

And while times may change, some things won't. Whether you use computers, make computers, or sell products and services for computers, Computerworld is still your major source of news today. And





For more recruiting tips, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).



RECRUITS
THE BEST!

RECRUITMENT ADVERTISING
Where the qualified candidates look. Every week.

1-800-343-6474 x201 375 Cochituate Rd, Framingham, MA 01701, Fax 1-508-875-3202

> Weekly. Regional. National. And it works.

SALES OFFICES

Associate Publisher/Senior Vice President Sales

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-879-0446

BOSTON: Vice-President Eastern Advertising Sales/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Ikels, Linda Clinton, COMPUTERWORLD, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 872-2915

CHICAGO: District Manager/Sharon R. O'Brien, COMPUTERWORLD, 980 N. Michigan Avenue, Suite 1440, Chicago, IL 60611 (312) 214-3606 FAX: (312) 214-4962

NEW YORK: Senior District Manager/Fred LoSapio, District Managers/Paula D'Amico, Rich Molden, Sales Assistants/Susan Kusnic, Jean Dellarobba, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786

LOS ANGELES: Southwestern Regional Manager/Fran Cower COMPUTERWORLD, 19800 MacArthur Blvd., Suite 500, Irvine, CA 92715 (714) 757-4123 FAX: (714) 757-4124

SAN FRANCISCO: Vice-President Western Advertising Sales: Richard Espinoza, Executive Assistant/Leticia Lehane, Senior District Bandagers/Emie Chamberlain, Kaye Sharbrough, District Managers/Milchele Gerus, Christine Curry, Sales Assistants/Candace Splivalo, Emily Gaytan, Ana Medeiros, Connie Sanchez, COMPUTERWORLD, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

ATLANTA: Senior District Manager/Bernie Hockswender, Sales istant/Debra Brown, COMPUTERWORLD, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758 FAX: (404) 255-5123

DALLAS: Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, COMPUTERWORLD, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882 FAX: (214) 385-1603

WASHINGTON, D.C.: District Manager/Rich Molden, COMPUTERWORLD, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 712-9786

CUSTOM PUBLICATIONS:

Vice President/Larry Craven, Director of Publishing Services/Carolyn Novack, Sales Assistant/Heidi Schuberthan, (800) 343-6474 FAX: (508) 879-0446.

CLASSIFIED ADVERTISING SALES:

Vice President/Classified Advertising/John Corrigan, Marketing

Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474. In MA (508) 879-0700

PRODUCT CLASSIFIED:

Sales Manager/Connie Martin Kearins, Sales Supervisor/Ted McNulty, Midwest Account Executive/F. Jay Savell, Solutions Directory/Nancy Whittaker, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474. In MA (508) 879-0700

RECRUITMENT ADVERTISING SALES DEFICES:

New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700. int Executive/Karen Lesko, (800) 343-6474, In MA (508) 879-0700

Mid-Atlantic: Regional Manager/Valerie Galbo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Caryn Dlott, (800) 343-6474

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith

Midwest: Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (708) 827-4433, Sr. Account Executive/Ellen Cross (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Sr. Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:

East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

st: Account Executive/Jill Greer, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:

sident/Frank Cuttita, Eastern Advertising Mana 187 Oaks Road, Framingham, MA 01701 (508) 879-0700

Western Advertising Manager/Ginny Pohlman, 180 Harbor Drive, Suite 215, Sausalito, CA 94965 (415) 331-7571 FAX: (415) 332-0778

CW PUBLISHING INC.

An IDG Company: The World's Leader in Information Services on Information Technology

CEO & Publisher

Gary J. Beach
Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171 Phone: 508-879-0700, FAX: 508-875-4394

ior Vice-Presid Editorial

Kevin McPherson Associate Publisher Senior Vice President/Sales Matthew Smith Senior Vice-Preside Operations

Marketing

PUBLISHER'S OFFICE Executive Assistant to the CEO/Publisher, Karen Elliott, SALES - DISPLAY Advertising Director, Carolyn Novack, Display Advertising Production Manager, Mauren Hanley, Display Advertising Coordinators, Peggy Hennessy, Paule Wright, SALES - CLASSIFIED Vice President Classified Advertising, John Corrigan. Classified Director, Derek E. Hullitziv, Product Classified Sales Manager, Connie Martin Kearins, Classified Operations Director, Cynthia Delany, Marketing Borector, Marketing Communications, Many Doyle. Account Manager, Marketing Communications, Elizabeth Phillips, Manager, Trade Show & Conventiens, Audrey Schohan, Marketing Communications Project Coordinator, Susan Thaster, Administrative Assistant, Patty Faherty, CIRCULATION Vice-President Circulation, Gail Odeneal, Director of Circulation, Gail Management, Mauren Burke, PRODUCTION Production Director, Christopher P. Cuoco, Production Manager, Beverly Wolff. SYSTEMS Vice President Information Systems, Linda Nelson, Administrative Sales Assistant, Lois Beninati.

INTERNATIONAL DATA GROUP

Patrick J. McGovern Board Chairman

Walter Boyd President

William P. Murphy Vice President Finance

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 194 computer publications in 62 countries. Fourty million people read one or more International Data Group publications each month. International Data florup's publications include: ARGENTINA'S Computerworld Algentina, Infowndid Argentina, Infowndid Argentina; ASIA'S Computerworld Hong Kong, PC World Hong Kong, Computerworld Southeast Asia, PC World Singapore, Computerworld Malaysia; AUSTRALIA'S Computerworld Australia, Australian PC World Malaysia; AUSTRALIA'S Computerworld Australia, Australian PC World. Australian Macworld, Network World, Reseller, IDG Sources: AUSTRIA'S Computement Desterrich, PC Test; BRAZIL'S Computement, Mundo IBM, Mundo Unix, PC World, Publish; BULGARIN'S Computement of Bulgaria, Caliworld, PC & Mac World Bulgaria; CANADA'S Direct Access, Graduate Computerworld, InfoCanada, Network World Canada: CHILE'S Computerworld, Informatica IntoCatieus, reteroid void Catieus, vintes Computerword, minimates, COLDMBIANS Computerword Columbia; CZECH REPUBLIC'S Computerword Release (Release of Computerword Columbia); CZECH REPUBLIC'S Computerword Computerword Danmark, LOTUS World, Maciniosh Produktstallag, Macword Danmark, PC World Danmark, PC World Produktguide, Windows World; ECUADOR'S PC World; EGYPT'S Computerworld(CW) Middle East, PC World Middle ECUALDY'S P. Wond; ESTY'S Computerwond(LW) Middle East, P. Wond Middle East; FINLAND'S Mikro P.C., Tietoviikko, Tietoverkko; FRANCE'S Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux; GERMANY'S Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere Computerworder Founds, Computerworder Kanis, Computerworder Kanifere, Information Management, Macwelt, Netzweit, PC Welt, PC Wooche, Publish, Unit, HUNGARY'S Alaplap, Computerworld SZT, PC World; INDIA'S Computers & Communications; ISRAEL'S Computerworld Israel, PC World Israel; TRALY'S Computerworld Tabla, Networking Italia, PC World Italia; JAPAN'S Computerworld Japan, Macworld Japan, SunWorld Japan, Windows World; KENYA'S East African Computer News; KOREA'S Computerworld Korea Macworld Korea, PC World Korea; MEXICO'S Compu Edicion, Compu Manufactura

tacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC Computeronly Print of Verlag, Computerworld Mexico, Medichand, Medichand Orlin, For World, Windows; THE NETHERAND'S Computer Totala, LAM Magazine, MacWorld; NEW ZEALAND'S Computer Listings, Computerworld New Zealand, New Zealand PC World, NIGERIA'S PC World Africa; NORWAY'S Computerworld Norge, C/World, NIGERIA'S PC World Africa; NORWAY'S COMPUTERWORLD NIGERIA LOUISMORTH NEGRIS 7º WHITE ARRISE, ROUWART S COMPAGEMENT HOUSE, CYWINI, LOUISMORTH NORGE, MARCHORTH NEGRIS Clinia, Jeautonias mientalinain, nor mario Este Strikter Product words, nor SREKZIERYS Computer Mess Digest: PHILLIPPRIES'S Computerwords, P. World, P. World, P. World, Correlo informatico, Computerwords, Medica, RomANIAPS P. CW ords, RUSSIAS'S Computerwords, Medica, Scott Strikter, S Communicaciones World, Macworld Espana, NeXTWORLD, PC World Espana, Publish, Sumworld; SWEDEN'S Attack, ComputerSweden, Corporate Computing, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Mikrodatom, PC World, Loraia Navelin/Lun, Lottis World, Mik.Carl., Mackend, Miklord, Michael Wellishing, & Design (CAP), Datalingenjoren, Maxi Data, Mindows World; SWITZERIAND'S Computerworld Schweiz, Macworld Schweiz, P. & Workstation; AIMANN'S Computerworld Taiwan, Global Computer Express, P. World Taiwan; THAILAND'S Thai Computerworld; TURKEP'S Computerworld Monitor, Macworld Turkiye, P. World Turkiye; L. WORLD'S Computerworld, UNITED INTROOM'S Lotus Magazine, Macworld, Sunworld; UNITED STATES' AmigaWorld, Cable in the Magazine, Maciwond, Suhwiona; UNITED STATES' Amigawion, Cabile in Classroom, CD Review, CIO, Computerworld, Deskloy Mideo World, DOS Resource Guide, Electronic News, Federal Computer Week, Federal Integrator, GamePro, ID6 Books, Infloward, Infloward Disrect, Laser Event, Macworld, Multimedia World, Network World, NetWork NetWorld, NetWorld NetWorld, NetWorld, PC Games, PC Letter, PC World, Publish, Sumeria, SunWorld, SWAPTPro, Video Event; YENCZUELDS Computerworld Venezeula, MicroComputerworld Venezeula; YIEINAM'S PC World Vietnam

Andersen Consulting 76 AT&T Business Communic AT&T Business Communications Services 78 AT&T Network Cable Systems 21 Avalon Software 9 B I Moyle Associates, Inc. 46 BMC 123 Rodget Internation 1

Borland International 17 BT 126 BT 126
Chipcom C3
Cincom Systems 73
Command Technology 15
Compaq Computer Corp. 69-72
Computer Associates 3, 8 Control Data Systems 112 CW Circulation 138 CW Classified 73, 76, 80, 111

CW Consultants Directory 80, 89-104 CW Editorial 126-127

Dell Computer Corp. 49 Digital Consulting 20 Digital Equipment Corp.
18-19, 47, 81-84, 134-135

IBM 29, 34-35, 62-65 IBM Personal Software Products 26-27, 33

Information Builders 106 Informix 25 Innovation Data Processing 7 Innovation Data Processii Interface Group 124 Knowledgeware 52, 53 Lotus Development Corp. otus Development 56, 88, 110-111 Micro Focus 11, 75 Microsoft 45 Motorola 22-23 NEC Electronics 86-87 NEC Technologies 118-119 Novell 77, 130-131 Oracle Corp. 5, 60 Pennant Systems 30-31
Powersoft C4
Racal Datacom 66
SAS Institute 48, 108
Sybase, Inc. 13 Symantec 43 Tecsys 61 Texas Instruments 34 Unify Corp. 40/41 Unisys 129 WHITE PAPER 57-60 Wordperfect 114-115 Workstation Group 74

This index is provided as an additional service.

The publisher does not assume any liability for errors or or

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:

COMPUTERWORLD, PO. Box 2043, Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.



Your New Address Goes Here

Name			
Company			
Address			
Clly	Sinta	7in	

Address shown: Address Business

Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free

> 1-800-669-1002 Outside U.S. call (614) 382-3322

COMPUTERWORLD

The Newspaper of IS PO. Box 2043, Marion, Ohio 43305

Companies in this issue

Page number refers to page on which story begins

Abero	Corp67,157
Abero	A
	leen Group 79
Adag	er Corp85
Adob	e Systems, Inc
Adsta	ır
Advai	nced Micro Devices, Inc 1
AICS	Research, Inc 85
Alleri	on, Inc 10
AMC.	Entertainment, Inc
Amda	thl Corp. 20,24 rican Automobile Association 109
Amer	ican Automobile Association 109
Amer	rican Software
Ande	rsen Consulting
Apple	ix, Inc
	Exploration and
	action Technology 107
	oft, Inc 61
ASK	Group, Inc 107
AT&T	F Bell Laboratories 32,79
AT&T	Γ67,137
TITA	echnologies, Inc
Attac	ehmate Corp 4
Autor	mobile Club 10
	В
Baar	ns Consulting Group, Inc 1
Bany	an Systems, Inc
Bay	state Gas
BUE.	Mobile
Dell A	Atlantic Corp
Bonk	eley Decision Systems140
	nd, Inc
BICC	Data Networks
	Strategic Decisions
BMC	Software, Inc
Bolt !	Beranek and Newman, Inc
Booz	Allen & Hamilton 128 and International, Inc 16,41,53,109
Borla	and International, Inc 16,41,53,109
Bose	Corp
Brad	mark Technologies, Inc85
-	С
Cabl	etron Systems, Inc 67,74,157
Carn	egie Mellon University32,137 er Hawley Hale Stores, Inc113
	les J. Singer & Co
Cher	nical Banking Corn 1
Chev	nical Banking Corp 1 ron Canada Ltd. NT49,121
Cisco	o Systems, Inc 157
	r Software, Inc
Clea	
Clea	binet Inc 67
Clea Com Com	binet, Inc
Clea Com Com Com	binet, Inc
Clea Com Com Com Com	binet, Inc
Clea Com Com Com Com	binet, Inc. 67 paq Computer Corp. 10,41,42,44,49 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44
Clea Com Com Com Com Com	binet, Inc
Clea Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp 10,41,42,44,49 puter Associates International, Inc. 15 puter Intelligence/InfoCorp 140 puter Partners. 44 puter Sciences Corp. 28,128 puter Systems Policy Project. 68
Clea Com Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp 10,41,42,44,45 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,125 puter Systems Policy Project 58 puter Systems Policy Project 58 puter Systems Policy Project 58
Clea Com Com Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp 10,41,42,44,48 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,125 puter Systems Policy Project 68 puterland Corp. 16 putervision Corp. 156
Clea Com Com Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp. 10,41,42,44,48 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,125 puter Systems Policy Project 68 puter land Corp. 16 putervision Corp. 156 share, Inc. 44
Clea Com Com Com Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp 10,41,42,44,49 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,128 puter Systems Policy Project 68 puter land Corp. 16 putervision Corp. 156 share, Inc. 44 ner Peripherals, Inc. 44
Clea Com Com Com Com Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp 10,41,42,44,48 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,125 puter Systems Policy Project 68 puterland Corp. 16 putervision Corp. 156 share, Inc. 44 necticut Attorneys Title
Clea Com Com Com Com Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp. 10,41,42,44,45 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 144 puter Sciences Corp. 28,125 puter Sciences Corp. 28,125 puter Systems Policy Project 55 puter Systems Policy Project 55 share, Inc. 45 ner Peripherals, Inc. 44 necticut Attorneys Title rance Co. 115
Clear Com Com Com Com Com Com Com Com Com Com	binet, Inc. 67 paq Computer Corp 10,41,42,44,49 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,128 puter Systems Policy Project 68 puterland Corp. 16 putervision Corp. 156 share, Inc. 44 necticut Attorneys Title rance Co. 12 terstone Computer Associates, Inc. 42 nerestone Computer Associates, Inc. 42 nerestone Computer Associates, Inc. 42 nerestone Computer Associates, Inc. 45 nerestone Computer Associates,
Clear Com Com Com Com Com Com Com Com Com Com	binet, Inc.
Clea Com	binet, Inc. 67 paq Computer Corp. 10,41,42,44,49 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 144 puter Sciences Corp. 28,128 puter Sciences Corp. 28,128 puter Systems Policy Project 68 puter Systems Policy Project 168 puterland Corp. 16 putervision Corp. 156 share, Inc. 44 neer Inc. 44 neer Inc. 44 necticut Attorneys Title ranee Co. 15 nerstone Computer Associates, Inc. 6 noration for National 68 portation of National 68 portation for National 68 puter Associates, Inc. 68 portation for National 68 puter Associates Inc. 69 puter Associate
Clea Com	binet, Inc.
Clea Com	binet, Inc.
Clea Com' Com	binet, Inc. 67 paq Computer Corp. 10,41,42,44,49 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Parlners. 44 puter Sciences Corp. 28,128 puter Systems Policy Project 68 puter land Corp. 16 putervision Corp. 156 share, Inc. 44 necticut Attorneys Title rance Co. 15 terrstone Computer Associates, Inc. 6 ting, Inc. 6 poration for National earch Initiatives 66 Research, Inc. 16 recendo Communications, Inc. 76,155
Clea Com	binet, Inc. paq Computer Corp
Cleacom Com Com Com Com Com Com Com Com Com C	binet, Inc. 67 paq Computer Corp. 10,41,42,44,48 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,125 puter Systems Policy Project 68 puterland Corp. 16 putervision Corp. 15 share, Inc. 44 ner Peripherals, Inc. 44 ner Peripherals, Inc. 44 ner Inc. 45 ner Inc. 46 ner Inc. 47 needicut Attorneys Title rance Co. 12 nerstone Computer Associates, Inc. 6 noration for National arch Initiatives 66 research, Inc. 16 research Communications, Inc. 76,155 Index, Inc. 122 Partners 122,122
Cleacom Com Com Com Com Com Com Com Com Com C	binet, Inc.
Clea. Com	binet, Inc. 67 paq Computer Corp. 10,41,42,44,45 puter Associates International, Inc. 15 puter Intelligence/InfoCorp. 140 puter Partners. 44 puter Sciences Corp. 28,128 puter Sciences Corp. 16 puter Vision Corp. 16 puter Vision Corp. 15 share, Inc. 45 ner Peripherals, Inc. 44 necticut Attorneys Title rance Co. 12 nerstone Computer Associates, Inc. 6 noration for National earch Initiatives. 6 research, Inc. 14 scendo Communications, Inc. 76,15 Index, Inc. 12 Partners 122,123 x Corp. 1
Clea. Com	binet, Inc.
Clea. Com	binet, Inc.
Clea. Com	binet, Inc.
Clea. Com	binet, Inc.
Clea. Com	binet, Inc.
Clea. Com	binet, Inc.
Clea Com	binet, Inc.

igiBoard	. 67
igital Communications ssociates, Inc.	157
igital Equipment orp12,20,28,79,105,122,	158
bisk/Trend, Incolch Computer System	. 44
olch Computer System Jonaldson, Lufkin & Jenrette	. 46 157
un & Bradstreet Software	6
ynamic Information Systems Corp	. 80
E Electronic Data	-
Systems Corp 24,28,122,	158
Electronic Retailing Systems, Inc Ellery Systems, Inc	156
Ellery Systems, Inc Environmental Systems Research Institute, Inc	54
Ernst & Young 42	,121
Europay International SA	20
Fleishman-Hillard, Inc.	107
Florida Power & Light Co	
Foreign Enchange Fransaction Systems, Inc	28
Forrester Research, Inc 67	,113
Frame Technology Corp Fujitsu Ltd	24
G	
Gartner Group, Inc.	
GE Capital Fleet Service General Mills, Inc	10
General Motors Corp	
Grafpoint, Inc.	105
Gupta CorpGymboree Corp	156
Н	
Hambrecht & Quist, Inc.	12
Hewlett-Packard Co 1,10,12,14,16,2- 	1,42,
High Yield Management Securities, Inc. Hitachi Data Systems Corp	54
IAM/G P-4- S4	OF
IAM/Secure Data Systems IBM PC Co	16
IBM 1,4,8,10,12,14,15,16,20,2 49,53,54,61,67,79,105,107,140	8,44,
ICL	24
Identity Systems Technology, Inc Inference Corp.	
Infonetics Research, IncInformation Builders, Inc.	1
Information Resources, Inc.	49
Informix Software, Inc 54 Ingersoll-Rand Corp	
Inkware Development Corp Integrated Systems Solutions Corp	41
Intel Corp 1,4	12,54
Intelligent SolutionsInterleaf, Inc	. 107
Intermedia Communications	
of Florida, Inc International Data Corp 10,49,53,54,79	0,128
Introl CorpIsean, Inc.	61
1	00
Jyace, Inc	. 110
K	
Kaiser Permanente	
Kedwell Software, Inc Keyfile Corp.	
KFC Corp	121
King County Medical Blue Shield Kinko's Service Corp	
KnowledgeWare, Inc.	
L L	
Layland Consulting	157

ge on a mention goog in	
Linkon Corp	
14,1042,43,33,011 179,107,109,158 Miles, Inc	
N	
Object Management Group	
P Pacific Gas & Electric Co	
Patricia Seybold Office Computing Group	
Q Q+E Software, Inc	
Retix	

7	<i>us</i>
	SHL Systemhouse, Inc 54,121
	Sign-On Systems, Inc 111
	Silicon Graphics, Inc
	Smartstar Corp
	Smithsonian Astrophysical Observatory . 67
	Software Engineering of America 105
	Software Publishing Corp 44
	Southern California Gas Co 113,117
	Speech Systems, Inc
	Sprint Corp
	Star-Tek, Inc. 67
	State Industries, Inc
	Stoneybrook Services
	Storage Technology Corp 10
	StratosWare Corp111
	Stratus Computer, Inc
	Inc
	SunSoft, Inc. 15
	Sybase, Inc
	SunSoft, Inc. 15 Sybase, Inc. 12,15,49,107 SynOptics Communications, Inc. 67,74,157
	Syntex, Inc 4
	SystemSoft Corp
	T
	Taco Bell
	Taligent
	Tandem Computers, Inc 15,20,32
	Tangent International
	Computer Consultants, Inc
	TeleChoice, Inc
	Telephone and Data Systems 6
	Texas Instruments, Inc
	The Alsys CASE Division 111
	The Chase Manhattan Bank NA
	The Pendulum Group, Inc
	The Sandia National Laboratories 67
	The Santa Cruz Operation 16,53
	The Ultimate Corp 10
	The Yankee Group 157
	Thomas-Conrad Corp
	Tivoli Systems, Inc
	Toshiba Corp
	Transaction Processing
	Performance Council
	Transarc Corp. 15 Travelers Corp. 157
	Tricord Systems, Inc
	U
	U.S. Geological Survey54
	Ungermann-Bass
	Unique Corp. 28 68 79
	Unisys Corp. 28,68,79 United Parcel Service, Inc. 10
	Unix International, Inc
	Unix System Laboratories, Inc 14,42,140
	US West 85
	V
	Valinor, Inc
	Valtek, Inc
	Varitec Corp 1
	VLSI Technologies42
	W
	Wang Laboratories, Inc 107,157
	Weizer Associates 16
	Wellfleet Communications, Inc 1,16,157
	Welsh, Carson, Anderson & Stowe 157
	Woodside Technologies
	WordPerfect Corp
ı	X
I	X/Open Co
	Xyplex, Inc

Friday Stock Ticker

| Converse | Converse

Some IPOs sink after soaring

NetManage, Inc. (NETM) showed last week that the initial public offering (IPO) craze is not over for technology companies. But the splashiest IPOs in the past year have not provided the best long-term returns.

NetManage, a Cupertino, Calif.-based maker of network applications and development software, zoomed up 52% to close at 24¼ on its first day of trading. Several other high-tech IPOs this year, including Powersoft Corp. (PWRS), Gupta Corp. (GPTA) and MathSoft, Inc. (MATH), have come close to doubling their share price on first-day enthusiasm.

However, at Tuesday's close, Powersoft ranked as only the 20th best gainer (up 37%) among computer stocks that hit the market in the last year, starting July 1992. Meanwhile, after less spectacular starts, superserver vendors Parallan Computer, Inc. and Tricord Systems, Inc. have both outperformed Powersoft. Each is up roughly 75%. Banyan Systems, Inc. (BNYN) is up 82% since its IPO, and PeopleSoft, Inc. has gained 78%. (See chart for the top gainers.)

The one-year period saw 51 computer-related IPOs that were worth \$10 million or more; on Tuesday, 27 of them stood above their IPO price. Seven more were roughly even with their initial pricing, while 17 issues had lost ground.

Gupta and MathSoft numbered among the losers. Gupta finished Tuesday at about 20% below its February IPO price of 18, while MathSoft was down 56% from its IPO price. Joining MathSoft at the bottom of the list were Computervision Corp. (CVN) at 75% off its initial price, Netrix Corp. (NTRX), down 64%, and Electronic Retailing Systems, Inc. (ERSI), down 48%.—Derek Slater

OP PERFORMING STOCKS THAT WENT PUBLIC IN THE FOUR QUARTI STARTING JULY 1992							
Company	iPO date	IPO price	Recent price	Change			
Cambridge Technology Partners	4/8/93	5	123/8	148%			
BHC Financial	4/7/93	14	331/2	139%			
Platinum Software Corp.	10/22/92	14	29	107%			
Corel Corp.	10/20/92	143/4	303/8	106%			
Data Research Associates, Inc.	7/1/92	7	131/2	93%			
The 3DO Co.	5/3/93	15	283/4	92%			

Ежен	52-Week Range .	SEPT. 24 WK NET WK PCT 3 PM CHANGE CHANGE	EXCH 52-WEEK RANGE	SEPT. 24 WK NET WK PCT 3 PM CHANGE CHANGE
OTC	MUNICATIONS and Network Services 40.00 15.63 3 COM Corp. 40.00 15.63 3 COM Corp. 65.00 40.63 ATRIT COMMUNICATION CO. 65.00 40.63 ATRIT COMMUNICATION CO. 64.88 46.75 BELLA TLANTIC CORP. 64.88 44.50 BELLA TLANTIC CORP. 64.89 44.50 BELLA TLANTIC CORP. 64.89 46.75 3.63 BOLL, BERLISOUTH CORP. 64.80 50.60 BELLA CORP. 65.50 CO. 65.	30,38 3.13 11.5 . 87.38 2-225 -2.5 . 87.38 2-225 -2.5 . 87.38 2-25 -2.5 . 87.38 2-25 -2.5 . 87.38 2-25 -2.5 . 87.38 2-25 -2.5 . 87.38 2-25 -2.5 . 87.38 2-25 -2.7 . 87.38 2-25 -2.7 . 87.38 1.13 3.7 . 87.25 1.00 2.2 2.4 . 87.25 1.00 2.3 2.4 . 87.25 1.00 2.3 2.4 . 87.25 1.00 2.3 2.4 . 87.25 1.00 2.2 2.4 . 87.25 1.00 2.2 2.4 . 87.25 1.00 2.2 2.4 . 87.25 1.00 2.2 2.4 . 87.25 1.00 2.2 2.4 . 87.25 1.00 2.2 2.2 . 87.25 1.00 2.2 2.2 . 87.25 1.00 2.2 2.2 . 87.25 1.00 2.2 . 87.25 1.00 2.2 . 87.25 1.00 2.2 . 87.25 1.00 1.5 4 87.25 1.00 2.00 15.4 . 88.20 0.00 0.0 15.4 . 89.20 2.00 15.4 . 89.20 2.00 15.4 . 89.20 2.00 2.00 15.4 . 89.20 2.00 2.00 15.4 . 89.20 2.00 2.00 2.00 . 89.20 2.00 2.00 2.00 . 89.20 2.00 0.00 3.0 . 89.20 2.00 0.00 3.0 . 89.20 2.00 0.00 3.0 . 89.20 2.00 0.00 3.0 . 89.20 2.00 0.00 3.0 . 89.20 0.0	TOTC 13.63 5.88 INTEREEAR INC. (L) OTC 16.50 4.75 INTERSOLVINC. OTC 16.00 7.75 KNOWLEDGEWARE INC. OTC 16.00 7.75 KNOWLEDGEWARE INC. OTC 23.75 15.50 LEGENT CORP. OTC 23.75 14.75 MORENT CORP. OTC 23.75 4.75 MATH-SOFT OTC 23.75 4.50 MCARE ASSOCIATES OTC 11.63 2.50 MCCA SOFTWARE OTC 12.00 2.25 MENTED GRAPHICS OTC 12.00 7.03 MICROSORT CORP. OTC 98.00 70.38 MICROSORT CORP. OTC 98.00 70.38 MICROSORT CORP. OTC 40.00 21.50 PARAMETER TECHNOLOGY OTC 40.00 21.50 PARAMETER TECHNOLOGY OTC 32.00 POWER OF CORP. OTC 40.00 20.00 POWER OF CORP. OTC 40.00 3.50 PALATHUM SOFTWARE (L) OTC 10.00 3.50 PALATHUM SOFTWARE (L) OTC 25.00 3.50 PALATHUM SOFTWARE (L) OTC 25.00 3.50 PALATHUM SCHOOLOGIES OTC 25.00 5.50 PALATHUM SCHOOLOGIES INC. OTC 25.00 5.50 PALATHUM SCHOOLOGIES INC. OTC 27.50 3.50 SOFTWARE TO PALATHUM SCHOOLOGIES INC. OTC 27.50 3.50 SOFTWARE TO PALATHUM ENC. OTC 27.50 3.50 SOFTWARE TO SOFTWARE SOFTWARE OTC 27.50 3.50 SOFTWARE SOFTWARE ASSOC. OTC 27.50 3.50 SOFTWARE TO SOFTWARE ASSOC. OTC 27.50 3.50 SOFTWARE THE PALATHUM ENC. OTC 27.50 3.50 SOFTWARE THE PALATHUM ENC. OTC 27.50 3.50 SOFTWARE SOFTWARE ASSOC. OTC 27.50 3.50 SOFTWARE SOFTWARE ASSOC. OTC 27.50 3.50 SOFTWARE SOFTWARE ASSOC. OTC 27.50 3.50 SOFTWARE THE PALATHUM ENC. OTC 27.50 SOFTWARE SOFTWARE ASSOC.	6.50 0.00 0.00 0.0 8.25 0.13 1.5 10.50 0.38 3.1 1.5 11.10 2.00 11.5 4.01 1.00 11.5 4.0
NYS OTC OTC OTC OTC NYS NYS OTC OTC OTC OTC OTC	48.88 39.50 NYMER CORP. (1) 30.00 14.50 OCTRE COMMUNICATIONS (1) 30.50 12.50 PICTURE TRANSPORTED (1) 30.50 12.50 PICTURE TRANSPORTED (1) 37.88 17.50 SCENTIFIC ÁTLANTA INC. 37.80 17.50 SCENTIFIC ÁTLANTA INC. 37.80 SCENTIFIC ÁTLANTA INC. 37.80 STRATACOM INC. 37.8	A7.75 - 1.00 - 2.11 ORP. 22.50 - 1.00 - 2.11 ORF 32.50 - 1.00 - 1.00 - 1.00 A88 - 0.13 - 2.5 A3.28 - 0.13 - 2.5 A3.28 - 0.73 - 1.7 COBP. 23.75 - 2.75 - 10.5 12.50 - 0.50 - 3.8 A88 - 27.75 - 2.25 - 8.8 A88 - 27.75 - 2.25 - 8.8 A7.88 - 0.25 - 0.5 A7.89 - 0.25 - 0.5 A7.89 - 0.25 - 0.5 A7.80 - 0.	Semiconductors 10.63 Advanced Micro Devices NYS 27.00 9.75 Analog Devices Inc.	UP 7.35° 2,6 27,00 2,00 8.0 27,00 3.09 8.0 37,0 3.09 8.0 37,0 3.09 8.0 37,0 3.09 8.0 38,1 37,0 25,8 4,1 37,0 25,8 4,1 37,0 25,8 4,1 37,0 25,8 4,1 37,0 25,8 4,1 37,0 25,8 4,1 37,0 25,8 4,1 37,0 25,8 4,1 37,0 4,1 38,8 4,1 38,1 3,1 3,1 4,1 4,1 4,1 4,1 4,1 4,1 4,1 4,1 4,1 4
ASE	9.25 2.50 COMMODORE INT'L 61.75 31.00 COMPAG COMPUTER CORP 49.88 13.50 DELL COMPUTER CORP. 89.25 50.25 MEMILET PACKARD CO. 41.00 24.00 SUM MICROSYSTEMS INC. 7.00 2.88 ZEOS INTERNATIONAL LTD 25.5 SYSTEMS 9.38 4.50 ANDAMIL CORP.	17.38 0.13 0.7 68.88 1.00 1.5 41.25 2.63 6.8 26.88 1.25 4.9 35.88 0.00 0.0 3.00 -0.19 -5.9 UP 3.90 5.88 0.38 6.8	Peripherals and Subsystems OTC 48.00 15.75 Ametrican Power Conversion OTC 21.38 15.50 Barctic file. OTC 18.00 3.50 CAMBER CORP. OTC 18.00 3.50 CAMBER CORP. OTC 30.50 5.00 COMPRETED FEBRUREALS OTC 30.50 15.00 CREATIVE TECHNOLOGIES INC. OTC 30.50 15.00 DATA RACE INC. (IL) ASE 13.25 4.75 DATARAM CORP. OTC 10.05 5.25 EMILENC CORP.	21,38 2.13 11.0 4.50 0.50 12.5 4.25 0.13 -2.9 10.13 0.13 1.3 20.00 0.88 4.6 11.00 -1.75 -13.7 8.38 -0.25 -2.9 36.00 2.38 7.1
NYS OTC NYS NYS NYS OTC OTC OTC OTC OTC OTC OTC OTC OTC OTC	8.75 3.69 CONVEX COMPUTER 6.13 2.25 CARY COMPUTER 30.89 19.00 CAY RESEARCH INC. 13.88 7.75 CAY RESEARCH INC. 13.89 7.75 CAY RESEARCH INC. 13.89 7.75 CAY RESEARCH INC. 14.80 7.80 7.80 7.80 7.80 7.80 7.80 7.80 7	42.38 1.75 4.3 41.88 1.13 -2.6 21.39 1.12 8.6 21.39 1.12 8.6 21.59 2.09 10.3 20.63 0.25 1.12 15.50 0.50 3.3 2.25 0.50 3.3	OTC 19.00 5.25 EMULEX CORP. OTC 19.00 13.25 EVANS & SUPHERLAND OTC 20.63 7.32 EVANS & SUPHERLAND OTC 34.00 9.31 Intelligent film. O. SYSTEMS OTC 24.00 11.3 Intelligent film. O. SYSTEMS OTC 24.00 14.25 KORAGING. OTC 19.63 4.38 MAXTOR CORP. OTC 19.63 4.38 MAXTOR CORP. OTC 17.28 5.75 MICROPILIS CORP. NYS 17.00 97.00 3M CORP. OTC 7.73 4.00 PRINTROMAXINC. OTC 7.33 313 RADIUS INC. OTC 7.33 313 RADIUS INC. NYS 16.88 9.13 RECOGNITION EQUIPMENT OTC 13.88 9.50 QUANTUM CORP. OTC 22.38 12.00 SEAGATE TECHNOLOGY NYS 27.88 17.67 YEXTROMINE.	6.75 0.50 8.0 16.75 0.00 0.0 9.75 0.38 4.0 9.75 0.38 3.2 2.63 0.38 1.2 2.63 0.38 1.2 2.63 0.38 1.2 1.638 0.13 0.8 5.50 0.38 6.4 6.75 0.50 8.0 103.75 4.00 3.7 7.63 0.0 7.0 9.00 1.13 1.4 4.50 0.13 2.7 1.13 0.50 3.2 4.13 0.13 2.9 1.13 0.50 3.2 1.13 0.50 3.2 1.15 0.50 3.2 1.1
OTC	32.75 14.50 COMPUTER ASSOCIATES 9.63 2.75 COMPUTER INSTITUTION CORP. 34.25 19.25 COMPUTER INC. 31.35 10.00 COMPUTER ASSOCIATES 10.00 COMPUTER INC. 31.35 10.00 COMPUTER INC. 31.35 10.00 COMPUTER INC. 32.35 10.00 GROUP ISOPTWARE (L) 32.35 10.00 GROUP ISOPTWARE (L) 32.35 14.00 GROUP ISOPTWARE (L) 32.35 14.00 GROUP ISOPTWARE (L) 42.75 14.75 INFORMATION RESOURCE 44.75 14.75 INFORMATION RESOURCE 42.75 10.31 INFORMATION RESOURCE	11.13 0.13 1.1 48.50 0.25 0.75 20.25 0.75 24.75 1.75 -6.6 61.75 7.00 12.8 24.88 0.88 3.6 15.00 1.13 8.1. 15.00 1.13 8.1 15.00 1.13 8.1 15.00 1.13 8.1 15.00 1.13 8.1 15.00 1.13 8.1 15.00 1.13 8.1 15.00 1.13	Services	32.00 0.00 0.0 16.50 -1.13 -6.4 19.88 0.38 1.9 14.75 0.88 6.3 21.63 0.13 0.6

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-484) is published weekly: except 6 issues in August and a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, 80x 9171, Framingham, Mass., 0170-0171. Copyright 1094 by CW Publishing/Inc., All rights reserved. Computerworld can be purchased on microfilm and microfilche through University Microfilms Inc., 200 N. Zeeb Road, Ann Arbor, Mich. a8106. Computerworld is







Computer Industry

Briefs

Investors eye Wang

As expected, Wang Laboratories, Inc. emerged from Chapter 11 bankruptcy protection last week. But in a last-minute surprise, two investment firms filed sealed bids with the court for the right to buy new stock from Wang in a private sale, producing a better deal than Wang had signed with one of the firms in August. Wang said it expects to return to profitability next quarter.

Oracle posts profit

For its first fiscal quarter of 1994 ended Aug. 31, Oracle Corp. said revenue increased 30% to \$398 million from \$307 million in the same period a year ago. Net income for the period rose 275% to \$37 million, compared with net income (before a onetime accounting charge) of \$10 million in the same period a year ago.

TSC revenue drops

Following the surprise ouster of its two top executives earlier this month, Chicagobased Technology Solutions Co. last week reported that its first-quarter revenue fell 12%, from \$15.5 million to \$13.8 million from a year ago. The systems integrator did post increases in both net and operating income for the quarter.

Buyout afoot

Digital Communications Associates, Inc. (DCA) in Alpharetta, Ga., has approved a \$195 million takeover bid from Welsh, Carson, Anderson & Stowe and Donaldson, Lufkin & Jenrettes's Sprout Group. The acquiring firms will pay \$18.75 for each of DCA's 10.1 million outstanding shares

Record earnings

For its first quarter-ended Aug. 31, 3Com Corp. reported net income of \$26.1 million, up 78% from the yearearlier period. Sales for the quarter increased 20% to \$162.1 million from the comparable period last year.

Internetworking Darwinism

Some vendors suffer as market evolves

By Joanie M. Wexler

The salad days of many internetworking companies are waning as the shakeout that so often signals a maturing market rears its head.

The main evidence of the shifting tides: the out-of-orbit financials reported by toptier vendors such as Cisco Systems, Inc., Wellfleet Communications, Inc., Cabletron Systems, Inc. and SynOptics Communications, Inc., compared with multiple-quarter downturns for technology-savvy but less pervasive companies such as Proteon, Inc., Ungermann-Bass, Inc. and Retix.

The dynamics of the network equipment industry, in which players were once prolific almost in spite of themselves, are shifting in step with user buying patterns to allow the "rich to get richer and the poor to get poorer," several analysts said.

Translation: The router and smart hub powerhouses that early on muscled their way into reams of corporate accounts are continuing to prosper at a dizzying pace—one that is accelerating as customers move toward enterprisewide, rather than departmental, purchase decisions.

These companies' early infiltration strategies have sewn up a lot of business for the future. And in many cases, that success will shut out smaller players regardless of what whizbang features these competitors might add to their products.

"Customers are now buying a 'company,' not just a product," said Todd Dagres, vice president of data communications research at The Yankee Group, a Boston consultancy. "Buyers are going with who is safe and looking at how much they're spending on R&D."

These attitudes serve to fuel the successes of the already aspiring vendors, he said.

This is reflected in the polar financials that have market leaders enjoying double-digit percentage growth rates in their stock prices while their second-tier counterparts suffer double-digit percentage losses (see chart above).

Facing the music

With these figures in mind, as a customer, "are you going to be the one to explain if you go with a vendor who isn't mainstream, and they run into trouble?" said Robin Layland, principal consultant at Layland Consulting in West Hartford, Conn., and former network planner at The Travelers Corp.

Hub giant Cabletron attributed much of its success to its notorious tightfistedness. "When times get tough, the guys in the best position will be those who are in best control of their costs and can still deliver," Cabletron Chairman Craig Benson said.

Rival SynOptics predicted some shakeout because companies focused on a single technology are headed toward commodity

markets. While SynOptics infiltrated the Ethernetic over-unshielded copper wiring (10Base-T) market ahead of standards, "six months after the standard, there were probably 200 companies offering 10Base-T hubs," said Gary Law, director of business alliances at SynOptics.

"This drove the cost down, leaving no margins for vendors with nothing else to sell and no money to expand into other areas." Law said.

Some firms, such as 3Com Corp. and Ungermann-Bass, have acquired other hub companies to fill in product gaps.

European woes

The last two quarters have been "very difficult" for Ungermann-Bass, according to Chief Executive Officer Ralph Ungermann, who resigned in July. He attributed the firm's problems to its traditional focus on a high-end market turned sluggish and a poor economic climate in Europe, once fertile ground for Ungermann-Bass.

Retix, too, attributed its 15.2% net loss for its second fiscal 1993 quarter ended July 3 to a weak European economy. The company, known initially for its Open Systems interconnect business, hopes to pick itself up in the third quarter with its foray into the telecommunications market.

Retix recently became partners with McCaw Cellular Communications, Inc. to provide the internetworking component of

split in early 1993.

SynOptics' 1992 stock price is adjusted to reflect a 3-for-1 stock

AS EXEMPLIFIED IN THE SMART HUB MARKET, THE RICH ARE GETTING

RICHER AS CONSOLIDATION AND NEW USER BUYING PATTERNS KICK IN

Stock price

Sept. 18, 1993

27

497/

251/2

103

414

101/4

14

91%

82%

65%

-12%

-44%

-44%

Stock price

16*

623/8

185/8

247/9

Сотрапу

3Com Corp

Bytex Corp.

Optical Data

Lannet Data

that company's cellular network.

Like Retix, struggling vendors "have to reinvent themselves and find a product or concept that people don't know they need yet, then create the need," Dagres said.

In the case of Proteon, long a strong technology player credited with inventing several technologies and driving many networking standards, "merchandising has become more important than it ever was before, and technology [competence] is assumed," said Elliott Honan, acting president since longtime President Patrick Courtin abruptly resigned in July. The company, which has reorganized into two independent business units, one on LAN adapters and one on internetworking products, "will get better at selling," he vowed.

cisco mates for market advantage

ith time to market a burning issue in the computer networking arena, vendors are busy buying out or partnering with others to quickly gain expertise, technology and products. The smaller partner's payoff is typically access to the more pervasive vendor's account base.

A recent example is Cisco's intended acquisition, announced last week, of start-up Crescendo Communications, Inc., a Sunnyvale, Calif., vendor of high-speed workgroup connectivity products. Cisco plans to buy the 60-person company for 2 million shares of Cisco common stock, which closed at \$47.25 per share at press time last week.

For Cisco, the main impetus behind

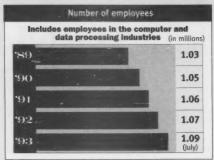
the buy was the router giant's quest for LAN-switching technology, said Paul Homburger, manager of business development.

That represents the next generation of high-speed internetworking, which analysts said will first coexist with, and eventually supplant, routing technology.

"There has been an increasing gap in the performance of workstations and networks," said George Kelly, principal at Morgan Stanley & Co., a New York financial analysis firm. "I think Cisco saw that teaming with Crescendo would give them multiple ways to solve the bandwidth bottleneck problem."

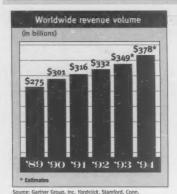
- Joanie M. Wexler

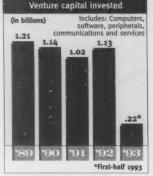
INDUSTRY PULSE: Computer industry



FCC rules on wireless

spectrum will be divided up among the wireless network service providers that support personal communications systems (PCS). The agency allocated 160 MHz of spectrum to PCS and said the country would be carved up into 51 regional "major trading areas," each to receive two 30-MHz slices of the radio spectrum. These major areas would be divided into more than 450 "basic trading areas," usually cities; each would receive seven PCS licenses, one 10-MHz and one 20-MHz spectrum band. The Federal Communications Commission last week finally ruled on how the radio





The 5th Wave by Rich Tennant



Inside Lines

Managing the internetwork

Novell plans next week to announce its long-awaited distributed version of NetWare Management System (NMS). Anticipated are a suite of system and network management applications that are expected to run as NetWare Loadable Modules (NLM) for managing distributed NetWare LANs and servers. The NLMs will be able to talk to one another to correlate data on an as-needed basis. Currently, all data goes to a Windows-based system, clogging the internetwork and raising user concerns about scalability. Mid-1994 seems to be the best-case scenario for shipment, a third-party source said. Meanwhile, Novell will introduce Rmon support so that NMS can collect Rmon-based LAN traffic and error data from a fleet of Novell's LANalyzer nodes.

Five's alive

Digital plans to introduce its long-promised Pathworks Version 5.0 LAN software next week at Networld. Due out by the end of the year, Version 5.0 includes a redesigned graphical user interface and a new ManageWorks component for managing native Novell NetWare and Microsoft LAN Manager servers from a client PC without a Pathworks server on Digital hardware. Digital wants to use ManageWorks to position Pathworks as a tool for integrating management of mixed LANs across a corporation in hopes of moving the software beyond the company's installed base. Some analysts remain skeptical about its chances on that score, however.

Partners of necessity

IBM has a "pre-alpha" version of its portable DB2 up and running under Windows NT in its Toronto laboratories, according to one source. Microsoft reportedly "is very interested" in seeing the project completed, as it might give Windows NT a Good Housekeeping-like "seal of approval" for many IS organizations already familiar with host DB2. The product, however, needs a lot of work before it gets to be a candidate for a serious beta release.

Can we 'tawk'?

Yet another user body is about to take a crack at that most irksome and amorphous of subjects: What do corporate users really want out of a network management system, and how do they get vendors to start providing the products to fill those needs? The Oct. 11-12 meeting of the Open User Recommended Solutions consortium in Boston will see the formation of a network management task force, whose founding members will be EDS, Pacific Gas & Electric, Intel, IBM and Legent.

Sprouting services

Banyan will announce this week at its ABUI user group meeting, and then at Networld the following week, the data and application distribution service it hinted at a couple of weeks ago [CW, Sept. 13]. The service will automatically move data or software updates from one disk or PC to another across a distributed enterprise network that can include Novell's NetWare, Banyan's Vines and Unix systems. While Microsoft's Hermes and Novell's Network Navigator will provide software distribution, this is the first data distribution package integrated with network operating systems; it is much-needed by corporate client/server installations, our source

A joke making the rounds at Unix Expo attempted to explain why Novell failed to announce last week that it was donating its Unix system specifications to X/Open Co. as a trademark form of Unix (see story page 14). Many vendors and industry groups were consulted in a furious round of discussions during the last week, the story goes. "The way I heard it described," one industry analyst said, "they went through the entire agreement from A to Z, and when they got to Z, it finally fell apart — and the Z stands for Zander." Ed Zander is president of Sun's SunSoft business unit, which sells its own Unix implementation, Solaris 2.X. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's 24hour voice-mail tip line at (508) 820-8555.

At Chipcom, switching technology isn't just hot this year.

In fact, we've pioneered it from the beginning.

For most of the time they've been in business, other network hub makers have built simple connectivity devices for departmental LANs.

But Chipcom got its start in the brutal environment of the factory floor. Big factory floors. From our very beginning, we created the equipment needed to reliably hold together large, mission-critical networks for big companies.

We realized very early in the game that building a vast network was one thing: Controlling it was another. And we also recognized that as entire enterprises became networked, the problem would become even more critical.

Which is why we were the first to turn to switching, and why we have been the leaders in switching technology ever since. Whether a particular application requires modular, bank,



port or seg-

ment-switching, Chipcom has the solution. And as ATM looms ever closer, Chipcom's cell-switching abilities will be ready for it.



Chipcom switching technology makes true enterprise networking a reality.

No other maker of intelligent hubs offers you the vast array of switching capabilities that Chipcom delivers.

No other line of hubs gives you the ability to engineer an enterprise-wide network with the rock-solid reliability, ease of management and control, and flexibility to handle continued change and growth as Chipcom does. And because our roots were planted in the world of big, far-flung networking, our underlying architecture has always assumed bigness. So you never have to scrap your earlier Chipcom investment as you grow.

When you're thinking big, you should be thinking Chipcom.

When a well-known retailer with over 2,000 stores decided to network their entire operation, they chose Chipcom. A large petrochemical company with refineries in six western states made the same choice. A major insurance company with thousands of offices across the U.S. investigated every hub makers' products before they selected Chipcom.

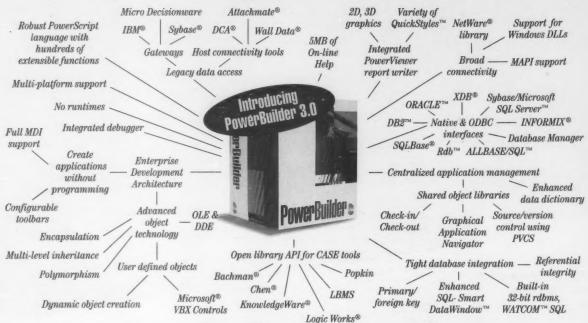
Hundreds of manufacturing companies, financial institutions, universities and government agencies have learned that if you're building a small network, you have a number of choices. But if you're thinking big, there's only one: Chipcom.

To learn what Chipcom switching technology can do for your organization, call **1-800-228-9930** and ask for your free copy of *Network Switching Solutions*. After all, if you're smart enough to realize what switching can do for your organization, you're smart enough to want to talk to the people who pioneered it.





Everything you asked for.



Introducing

PowerBuilder

Power Viewer

PowerBuilder™ is the tool of choice for IS development teams who want results, not excuses. It has always provided the maximum in power and ease of use in multi-database client/server application development. Without compromise.

And with the introduction of PowerBuilder 3.0, now it's even better. More powerful. More graphical. The Enterprise Series More open. A glance above will give you some idea of what we're talking about.

And there's more. PowerBuilder's success has spawned a whole new suite of products that span the enterprise from IS to end users. Called the Powersoft Enterprise Series, it gives you best-of-breed tools that share Powersoft's Common Object Technology — thus enabling enterprise-wide collaborative development. This represents the first and only true Enterprise Development Architecture, letting IS use object technology to empower end users, for an "objectempowered" enterprise.

PowerBuilder drives the model, letting IS create and manage the use of powerful shared objects - forms, queries, reports and graphs. Then, using these shared objects, PowerViewer™ lets end users quickly create the business reports and graphs they need. PowerMaker[™] delivers full PowerViewer functionality plus its own, built-in, WATCOM SQL database and the tools to develop robust

form-based personal client/server applications - without programming.

PowerBuilder, PowerViewer, PowerMaker. Each one, the best in it's class. Together, in a class by themselves. The Powersoft Enterprise Series.

PowerMaker \$99 PowerViewer \$49

GET THE WHOLE ENTERPRISE STORY NOW! CALL 1-800-395-3525!

A new kind of power for a new kind of computing

